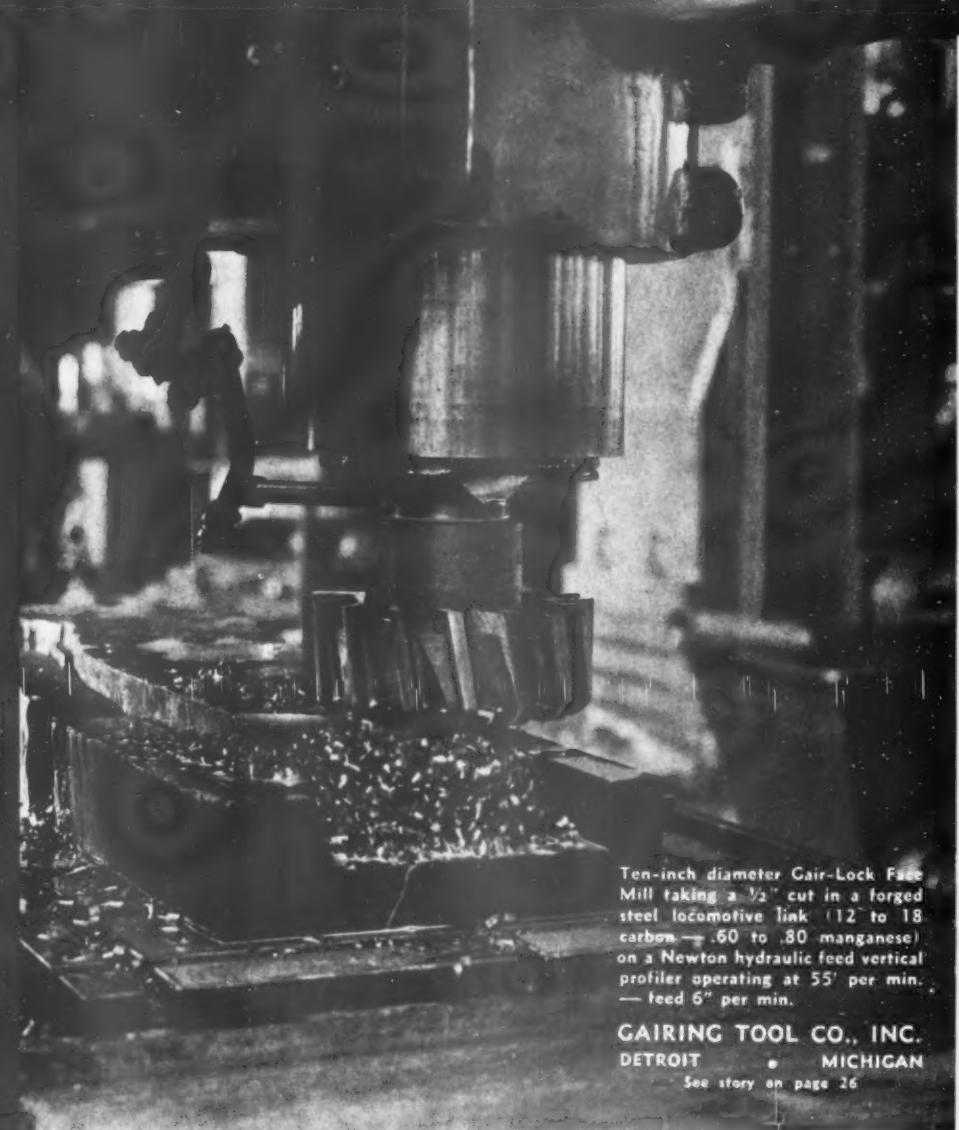


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# TOOL ENGINEER

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DETROIT



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GAIRING TOOL CO., INC.  
DETROIT • MICHIGAN

See story on page 26

SEPTEMBER  
1937

Official Publication of the  
AMERICAN SOCIETY  
OF TOOL ENGINEERS

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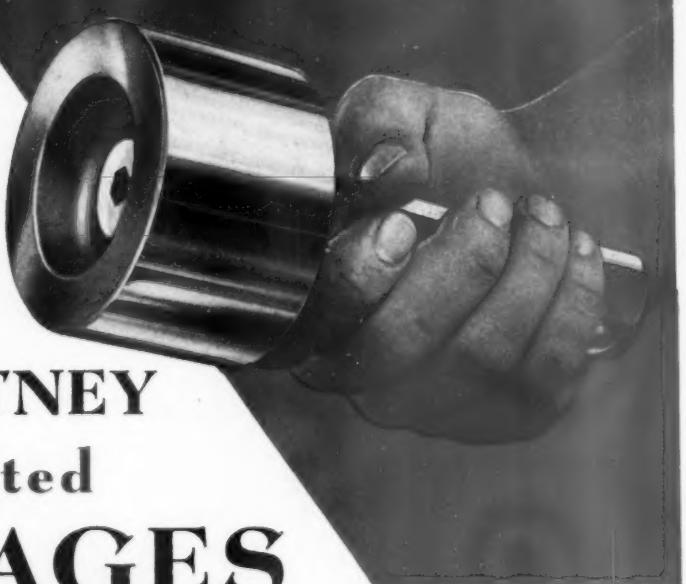
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A well known tool engineer  
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Plated Plug Gages."*

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# PRATT & WHITNEY Chromium Plated PLUG GAGES



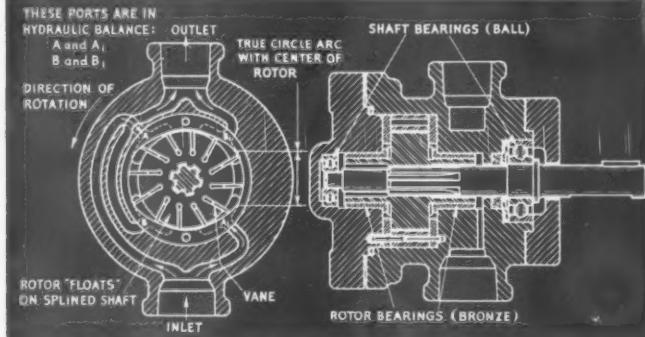
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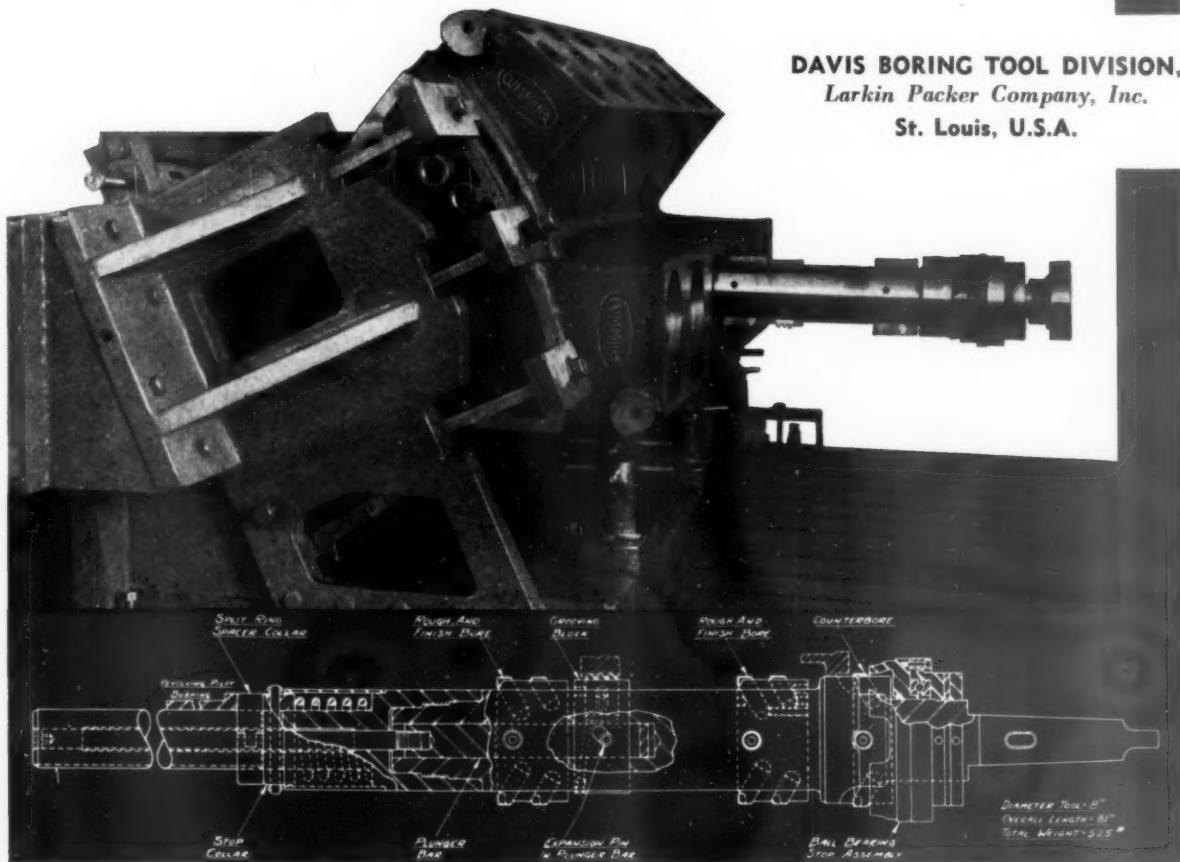
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# The Tool Engineer

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Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. VI

SEPTEMBER, 1937

No. 5

## Contents This Issue

### NEWS

Production Perspectives—News of Mass Manufacturing from Everywhere	16, 18
Chapter Doings	19, 30

### TECHNICAL

Designing for Dynamic and Static Balance Correction, by H. W. Moore	10, 11
The Making of Firthite Sintered Carbide Tools, by Malcolm F. Judkins	13, 14

### GENERAL

What Would You Have Done? by W. F. Schap-horst	15
Romance Leads to Wedding Bells	15

### ADVERTISERS' INDEX

Travelogue of the Honeymooners	24
George Adolph Schreiber, an obituary	12

### A.S.T.E.

Chapter Doings	19, 30
September Meetings	17

### EDITORIAL

Freedom Means Progress, an editorial, by A. E. Rylander	9
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### FEATURES

Letters	9
New Equipment	42
New Literature	40
Try-Outs	36
Handy Andy's Workshop	32, 34

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Society of Tool Engineers, Incorporated. The membership of the Society and readers of this publication are practical manufacturing executives such as master mechanics, works managers, Tool Engineers, tool designers and others who are responsible for production in mass manufacturing plants throughout the nation and in some foreign countries.

Owing to the nature of the American Society of Tool Engineers organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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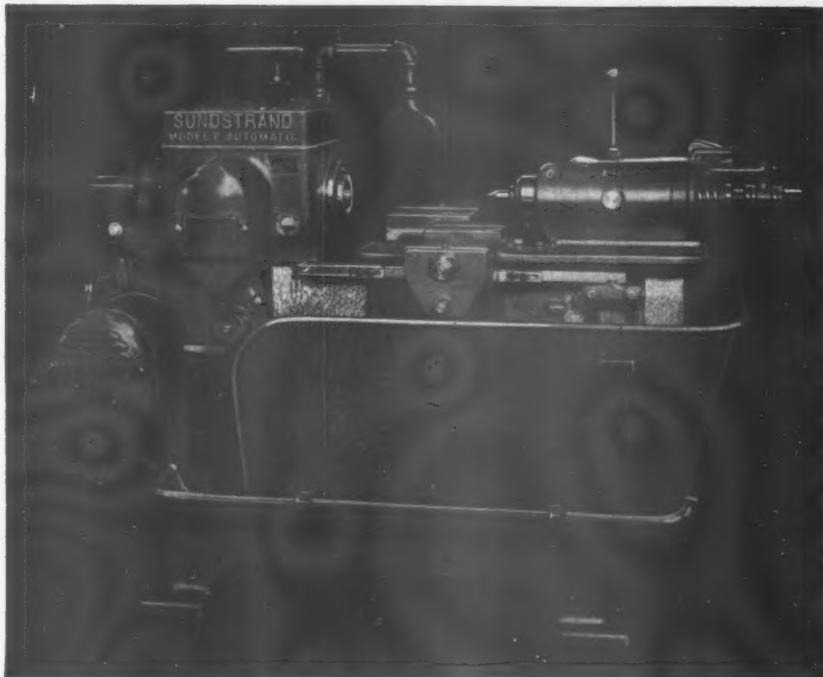
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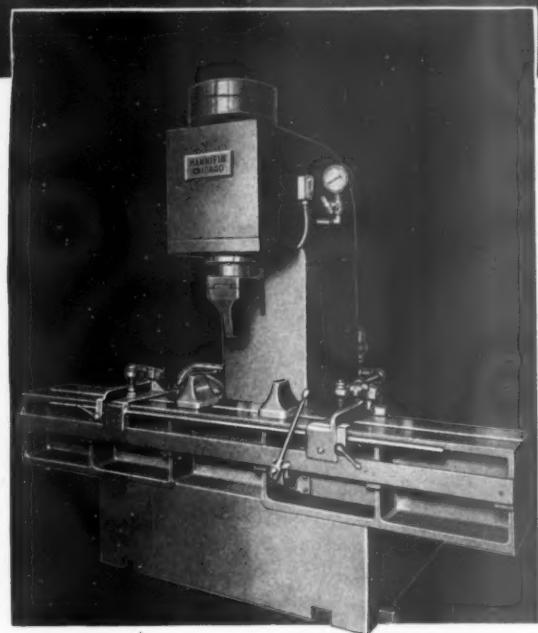
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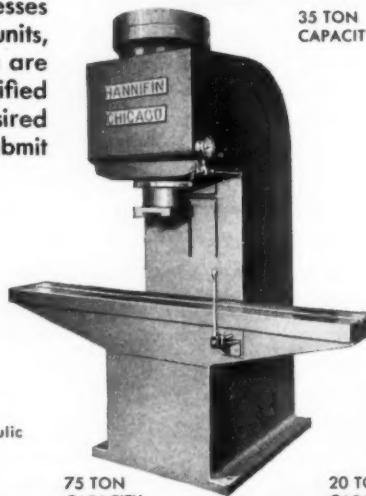
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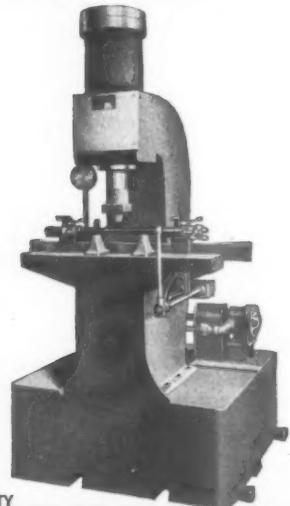
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# FREEDOM MEANS PROGRESS

## An Editorial By A. E. Rylander

THERE is, at this time, an implied threat of censorship of the nation's press, a menace that, should it materialize, would also throttle engineering journals. We can't have that. The technical press is the herald of mechanical progress, it fosters and promotes that progress, is a clearing house for exchange of ideas. It must be free to express the thoughts of the engineering profession, even when expression transcends the purely technical and encroaches on matters of national policy. To insure freedom of the technical press it may be politic for the various engineering societies to combine into one National Association of Engineers, each group maintaining its autonomy but lending its strength to the whole.

With the nation in the throes of an industrial as well as an economic and social rebirth, it is essential that some one rational body keep a clear head, which implies independence of subversive alliances but not necessarily a strict neutrality. For, should a vital issue impend, such a body may act to sway that issue to the right.

Perhaps no other vocational group is so fitted to be the key-stone of reconstruction as the engineers, not necessarily Tool or Mechanical engineers, but all engineers since these have so many interests in common. It is no stretch of the imagination that, were all engineering groups united into one national body, it could easily be one of the most powerful and constructive forces in the land. What is more to the point, it would doubtless use its power sparingly and wisely. For engineers, by virtue of native intelligence and training (they rank in intelligence) have acquired powers of reasoning and analysis beyond other professions. Dealing with both the abstract and the concrete, they have learned to bridge these extremes, to resolve vision into practical results.

The technical press is the open forum of the engineering mind. It must be left open for free discussion, else the progress which has made this land what it is will be arrested. The only way that the threat of censorship can be negated, in our field, is to back engineering brains with engineering unity. The writer claims no originality for the thought, but he considers unity possible of accomplishment since many minds converge on the idea at this time. What is your opinion?

## Letters

Dear Sirs:

I am very much interested in your publication, so much so that I would like information as to requirements for membership in an A.S.T.E. Chapter and whether we have a Chapter in the city of Washington, D. C.

I am employed in a minor executive capacity by the Federal Government and my daily work has to do with manufacturing process and direct tooling for productive machine work.

I am

Very respectfully  
H. W. Morley

1507 White Place, S. E.  
Washington, D. C.

Full details have been sent from A.S.T.E. headquarters. Membership in this Society would be of great help to you in your work. Would you like to initiate the activities incident to forming a branch chapter in Washington? If so write us for complete information.—Editor.

▼ ▼ ▼

Gentlemen:

I have been informed that the "Tool Engineer" is published monthly, free of charge. If my understanding is correct, I would appreciate receiving copies each month.

Yours very truly,  
W. C. Newcomb  
Equipment Engineer  
Watertown Arsenal  
Watertown, Massachusetts.

As an equipment buyer, we will be pleased to send you "The Tool Engineer," free of charge. However to obtain full value from it, as well as the many activities and benefits of membership, we urge you to become a member of the American Society of Tool Engineers.—Editor.

▼ ▼ ▼

1322 Woodbine Place  
Fort Wayne, Indiana  
August 13, 1937

The Tool Engineer  
2842 W. Grand Boulevard  
Detroit, Michigan

Dear Sir:

Will you please furnish me with application blanks and information pertaining to membership in the American Society of Tool Engineers?

I am a Tool Engineer at S. F. Bowser and Co.

Yours very truly,  
E. J. Molin

Application blank and full information have been sent you, Mr. Molin. Would you like to join with others in promoting a branch chapter in Fort Wayne? Let us know if you are interested.—Editor.

▼ ▼ ▼

Adrian, Michigan  
August 21, 1937

"The Tool Engineer"  
2842 W. Grand Blvd.,  
Detroit, Mich.

Gentlemen:

Will you kindly send us a sample copy of your magazine for the inspection of the various men in our tool department. They wish to examine it with the view of subscribing to it.

Very truly yours,  
Stubnitz-Greene Spring Corp.  
M. Stubnitz

MS:DC

"The Tool Engineer" is not sold on a subscription basis. It is the official publication of the American Society of Tool Engineers, and we suggest that your men consider the advantages of membership in The Society. Full details have been sent to you.—Editor.

# Designing for DYNAMIC AND STATIC BALANCE CORRECTION

## PART I

by

H. W. Moore, President  
Globe Tool & Engineering Company  
Dayton, Ohio

IT IS indicative of the machine age in which we are living that the average person is "vibration-conscious." Vibration in our automobiles, electric refrigerators, vacuum cleaners, and office appliances such as dictaphones, electric fans, and so on, has forced itself to the attention of the users of these mechanical units to such an extent that, in many cases, it constitutes effective sales resistance. This form of sales resistance is recognized by manufacturers, engineers, and designers, to whom the damaging effects of vibration are well known.

The necessity for the proper balancing of rotating parts in machines that are used in the manufacture of quality products is fast becoming recognized. Engineers and designers of new machines should so design their products that provision can be made in the design to permit correction for dynamic unbalance, if the design incorporates rotating parts that are to operate at high speeds. A small flange can be provided, or holes can be provided for adding rivets or weights. A little thought applied to design will save countless dollars in production costs. The dynamic balancing ma-

chines now available are accurate; they are adapted for the balancing of all products—large or small, and the amount of time required in the balancing operation is reduced to the minimum. The bulk of the time is consumed in making the correction, and this time can be reduced by proper design.

This discussion is offered to urge designers of new equipment to analyze the possible need for dynamic balance in the new product under consideration, and if it is necessary, to incorporate suitable correction methods in the design of the rotating parts. Too often in the past this has been completely ignored, leaving the correction method for the Production Department to settle; usually it is then too late to obtain efficient, low cost correction for bal-

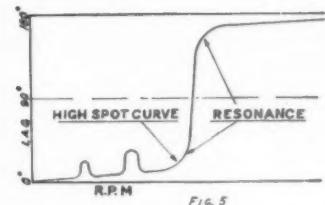


Fig. 5—Chart illustrating the relation of "log" to speed on flexibly-mounted rotating parts.

tant today than ever before, as all mechanical equipment is running at higher speeds than formerly. As the force of unbalance increases in proportion to the square of the speed of the rotating unit, the damaging effect of unbalance increases accordingly.

In the past, vibration has been eliminated to a certain extent through correction of the unbalance by static or "standing" balance. The part to be balanced is placed on knife edges which have previously been leveled, and the low spot, which has been determined by force of gravity to be the heaviest spot, is marked and afterward lightened by the removal of a certain amount of material. However, it has been observed that no matter how carefully the operation has been performed, when the part is assembled in the machine and operated at high speeds, the unbalance still exists and is sometimes greater than before the part was balanced. Thus it is clearly evident that it is impossible to determine, by static balance, the proper locations for correction weights in a lateral plane. This point is best illustrated by the drawing (Fig. 1), in which a cast cylinder "C" is shown mounted on the shaft "A-B" and the assembly placed on the knife edges "D-E". It is assumed that the cylinder has been turned true, but that underneath the surface at the point "G" is a blowhole which is invisible. When placed on the balancing ways, the assembled shaft will roll and come to rest with the heavy spot down, which shows that the part is out of balance statically. To correct this condition, the mechanic will drill holes of equal depth into the sides of the cylinder at the points "J-J" until enough stock has

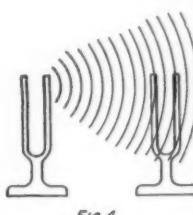


Fig. 4—Sound waves produced by striking a tuning fork will produce vibrations in another tuning fork.

ance and Production worries along with an expensive correction method, even though using modern time-saving Dynamic Balancing Machines.

A little original planning on the design, with an understanding of the problem involved, will more than repay the study and effort, in savings on the balancing in production.

A short discussion of the principle of dynamic balance follows: Vibration is caused by lack of balance in the rotating parts of machinery. It has always been a source of trouble to engineers and designers, due not only to the fact that the excessive wear on the bearings caused by vibration affects the accuracy and life of the machine, but also to the fact that the exact point of "unbalance" has been difficult to locate and consequently difficult to correct. However, such correction is more impor-

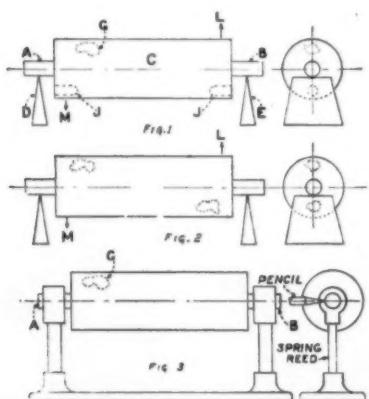


Fig. 1—Drawing illustrating static method of balancing. Fig. 2—Note the invisible blowholes. This shaft is balanced statically, but badly out of balance dynamically. Fig. 3—This drawing illustrates the principle of the modern-type dynamic balancing machine.

been removed so that the cylinder will remain at rest in any position in which it is placed on the ways.

When the cylinder is rotated at low speeds, the vibration may not be serious, but as the speed is increased, the effect of the improper placing of the correction drilling will be apparent. The centrifugal force of the heavier side "L" will produce vibration in the bearing "B," and the bearing "A" will vibrate due to the centrifugal force of the heavy point "M," all of which is caused by inability to determine the amount of weight to correct for on either side of the cylinder.

In (Fig. 2) is shown a similar cylinder with two blowholes at points 180 degrees from each other and on opposite sides of the cylinder. If these blowholes displaced approximately equal weights of metal, the cylinder when placed on the balancing ways would appear to be in good static balance. Upon rotating the cylinder, however, a vibration corresponding in intensity to the speed would be set up by the centrifugal force of the heavy sides "L" and "M." Such unbalanced forces may occur in any amounts and at any angles from each other; thus correcting for running balance by static methods becomes an impossibility.

The only solution consists in balancing the part dynamically, which means that the force of unbalance on either side must be measured and the angle at which the correction should be made must be located. This can be done by the use of a properly designed Dynamic Balancing Machine. After the part has been properly balanced dynamically, it can be rotated at any speed within the safety factor of the material without apparent vibration.

If the cylinder is mounted on bearings that are flexibly mounted as shown in (Fig. 3), and is rotated by external means, the bearings "A" and "B" will vibrate, although "A" will vibrate more than "B," as the blowhole is nearer to the bearing "A." Now, if a pencil is held close to the shaft, the mark produced on the shaft will bear a definite relation to the heavy spot, although it will not be directly over it. For purposes of discussion the point at which the pencil mark is made will be called the "high spot," as it is produced by the force of unbalance throwing the shaft out of its center of rotation. The high spot always lags behind the heavy spot in the cylinder from a few degrees to nearly 180 degrees, depending upon two conditions —

the resiliency of the bearing mountings, and the speed at which the part is rotated.

On rigid mountings, the lag stays below seven degrees; on flexible mountings, the lag will be below seven degrees at the start but will quickly approach 180 degrees as soon as the critical speed of the mounting has been passed. This critical speed is the speed at which the frequency of vibration of the rotating part is in harmony or resonance with the period of vibration of the mounting. The mounting shown in (Fig. 3) is a flat spring reed. All bearing mountings are resilient to a degree, regardless of how rigid the design; weak bearing pedestals have a low frequency, while the frequency of heavier, more rigid pedestals is higher.

Occasionally the vibration of a rotating part in a machine vibrates the whole machine, which in itself has a period of vibration. A good example of this condition is the automobile; at low speeds the motor usually runs smoothly, but as the speed is increased, one or more periods of vibration are noticed. These periods of vibration in the motor may synchronize with the vibration of the entire frame of the car, or with various metal parts, as the points of resonance of these parts are reached. Rubber mountings are now used to reduce the effect of vibration in automobile motors. They do not eliminate it, but they lower the frequency to a point that does not come within the normal operating ranges of the motor. The damaging effect of the vibration upon the bearings of the motor is still present.

"Critical speed" can best be illustrated by placing two tuning forks of the same pitch or resonance near each other. When one fork is struck, a vibration will be produced in the other although there is no mechanical connection between the two. This vibration of the unstruck fork is caused by the repeated, but slight, effect of the sound waves set up by the struck fork, as illustrated in (Fig. 4). The two forks having the same frequency, the small repeated impulse of the sound wave gradually increases the vibration of the unstruck fork until it has almost the same amplitude of vibration as the fork that was struck. If the two forks are brought to rest and a violin is played near them, a tone of the violin will be found that will start both forks vibrating violently. This tone is the same pitch as the forks; thus the forks are said to be in resonance, and the frequency of the

tone is said to be the resonant or critical frequency of the forks and violin.

In our automobiles, electric refrigerators, or other machines that vibrate objectionably, this critical frequency is synonymous with the speed at which the vibration of the motor synchronizes with the inherent frequency of other parts of the machine. Most of the vibration can be eliminated by proper dynamic balance, but as it is not practical to balance to a state of absolute perfection, due to the cost, thought should be given to improving the design by strengthening weak parts or by bracing so as to either eliminate the resonant vibrations of these parts entirely or raise them to a pitch that will not be in resonance with the operating speeds.

The graphic chart (Fig. 5), illustrates the relation of lag to speed on flexibly mounted rotating parts. It will be noted that, at the low speed, the lag is practically zero. As the speed is increased, the lag increases slowly to a narrow speed zone of 90 degrees, which is the "resonance" speed or critical point. If this zone is passed, the lag approaches 180 degrees immediately. It will be noticed, however, that smaller critical speeds are indicated on the lag curve. The frequencies at these speeds are harmonics of the major critical speed, the relation being the same as the relation of the octaves on a piano. These harmonics are seldom serious, as they are so slight in force, but in rare cases they become a factor and must be adjusted for.

It will be noticed that the high spot indicated by the pencil mark on the shaft is erratic in its behaviour, which, to those not acquainted with dynamic balance and the behaviour of the "high spot," would

(Continued from page 12)

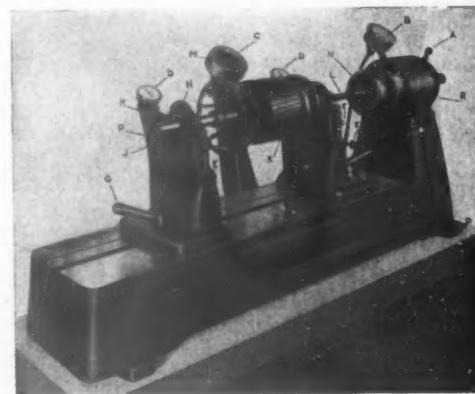


Fig. 8—Dynamic balancing machine in which a Neon light is used to locate the point of unbalance.

## GEORGE ADOLPH SCHREIBER

It is with deepest regret that we announce the untimely demise of A.S.T.E.er George Adolph Schreiber, who succumbed August 16th as a result of injuries received from an automobile accident.

Mr. Schreiber was a loyal worker and active proponent of the A.S.T.E..



G. A. SCHREIBER

a man of wide contacts and experience, world traveler, a forceful and constructive champion of progress.

Mr. Schreiber was born in Germany fifty-six years ago. He came to the United States thirty years ago from the Daimler Motor Works where he had charge of tool design and shop equipment.

In Detroit, in the early days of the automotive industry, he was closely associated with automotive executives and engineers whose names are now very well known in the industry. He was a frequent member of the now famous "round table discussions" at the old Pontchartrain Hotel.

In these early days of the automotive industry, Mr. Schreiber was first with the old E. M. F. Company when Detroit's Piquette Avenue was "Motor Row," with Henry Ford's shop "next door" and the Fisher Brothers were just starting out "nearby" in a small shop. Through the years Mr. Schreiber's duties involved the handling of engineering, export and sales matters which necessitated his travel into many foreign factories. In 1920 and 1921 when Walter P. Chrysler reorganized

(Continued on Page 38)

## Dynamic Balance

(Continued from page 11)

make the determining of the heavy spot difficult. Previous discussion has shown that very small amounts of vibration, such as sound waves which have an infinitesimal mechanical force, can produce mechanical vibration that will actually wreck improperly designed structures. Soldiers marching across an old-style suspension bridge are required to break step and thus avoid setting up a vibration which might wreck the bridge. Large steel beams can be made to vibrate violently by playing a violin in their immediate vicinity.

However, such small forces have their uses. After many years of research, this principle of resonance has been applied to the design of a machine with which dynamic balance "couples" can be eliminated to a finer degree than has heretofore been thought possible. In operation, the machine magnifies small vibration as much as 50 times; consequently, when a condition of unbalance has been corrected to such a point that a vibration which has been amplified 50 times is practically eliminated, perfect balance of the rotating part is obtained with complete absence of vibration at high speeds.

The term "ounce-inch" has been accepted as the unit of measure of the force of dynamic unbalance. Thus one ounce-inch would be an unbalance force of one ounce at a one-inch radius. One-tenth ounce-inch would be one-tenth ounce at one inch radius, or one ounce at one-tenth inch radius. In the balancing of small series-wound armatures, the machine referred to corrects unbalance within an accuracy of 0.001 ounce-inch. If necessary larger machines can work to a proportional accuracy.

The most difficult part of the problem is, of course, the locating of the heavy spots of unbalance for correction purposes, due to the changing relation of the high spot to the heavy spot, as noted on the curve (Fig. 5). However, if this location is always taken above the critical speed at a predetermined point, the lag can easily be controlled. In the machine shown in (Fig. 6), a Neon light is used to locate the heavy spot. The Neon light, being cold light with no lag factor, is ideally suited to this use. It is also used in the Stroboscope to stop motion at very high speeds.

The Neon light locator dial is indicated at "C" (Fig. 6). The light ro-

tates in synchronism with the part to be balanced, which is rotated by the variable-speed reversible motor "R." The Neon light is energized by the distributor in the flywheel "N," which in turn receives its current from an external source of high voltage. As the work-piece is rotated, vibration is set up by the unbalanced condition and the light is flashed by contactors in the machine heads "P," contact being made through vibration of the spring reed mounted bearings. The width of the light band produced is controlled by means of the screws "E." Fixing of the location of the light band is done manually by means of the two indicators "M," which are marked "R" and "L" to correspond to the right and left machine heads.

With the location of unbalance fixed on the locator dial, it is only necessary to stop the machine and bring the light back to the spot recorded on the dial. An arrow on the machine head locates the heavy spot for correction purposes accurately on either side of the part being balanced. One direction of rotation only is required to find this location, and the magnitude of unbalance is taken automatically at the time the location readings are taken. The entire operation of finding the location of unbalance on both sides of the part to be balanced and recording the magnitude of unbalance on both sides for correction purposes takes less than 30 seconds on small work.

In the foregoing, critical speed has been considered only as pertaining to the relation of mounting vibration to rotating speeds. Critical speeds are also encountered in the rotating parts themselves due to shaft deflection when rotated at high speeds. This condition is caused by unbalanced forces occurring in planes on long shafts which deflect the shaft or throw it out of the theoretical center and cause difficulty in correcting dynamically, as it is impossible to determine the lateral planes in which these forces exist. They can usually be corrected by strengthening the shaft.

With a modern Dynamic Balancing Machine it is possible for a manufacturer of machinery in which rotating parts are used to place his product on a 100 percent dynamic balance basis. The time required to balance dynamically is in most cases no greater than the time required to balance statically, and there is no comparison in the results obtained.

The concluding part of this article will follow in an early issue.—Editor.

# The Making of Firthite Sintered Carbide Tools

A paper presented before Pittsburgh Chapter A.S.T.E., June 11, 1937

By

Malcolm F. Judkins

Member A.S.T.E.

Chief Engineer  
Firth Sterling Steel Company

OUR purpose tonight is three-fold. To very briefly outline powder metallurgy, to describe the making of Firthite and tools, and to show Pittsburgh Tool Engineers our new plant.

That Tungsten Carbide is not new is clearly apparent when we recall that Moissan, an early French experimenter with the electric arc furnace probably made the first tungsten carbide about 1898. He heated tungsten or its oxide with sugar carbon in a graphite crucible to the full arc temperature. He described the product as extremely hard but glass-brittle, porous and spongy. In 1904 Honniman in Germany added to the store of information about carbides through his work on electric lamp filaments. In 1912 Baumhauer of the Osram Lamp Works, outside Berlin, conceived the idea of soaking up molten iron in the pores of melted tungsten carbide filling the crevices and enabling the working of the metal to form wire drawing dies for tungsten lamp filaments. Karl Shroter, also of the Osram Works, developed a process similar to that in use today, wherein powdered tungsten carbide was mixed with cobalt, nickel and iron powders, pressed to shape in molds and heated in hydrogen to sinter the powdered metals into a dense non-porous mass. Shroter encountered difficulty in producing uniform tungsten carbide powders and mentioned his troubles to Professor Strauss, Director of Research at the Krupp works at Essen. Strauss solved the problem and carried the development much further, result-

ing in many of the patents under which we manufacture Firthite today.

## Powder Metallurgy

Powder metallurgy is a new method of producing metallic alloys which are never melted, but exhibit many of the desirable properties of a cast metal, at the same time escaping many of the serious defects of cast materials.

Sintered metals exhibit high metallicity having a high luster, high thermal and electrical conductivity, great density and strength and extreme hardness. They are free from ingotism, grain growth, segregation and directional weaknesses as compared to cast metals and crystalline solids. Their method of manufacture minimizes gas absorption, thus avoiding blow-holes, fissures, hot shorts and similar defects.

## The Sintering Process

A wide field is open to the pow-

der metallurgist. The sintering process permits alloying of metals of greatly differing specific gravities such as zinc and lead and of widely separated melting points such as silver and molybdenum. Mutually insoluble metals such as lead and copper may be mixed, and finally metals and non-metals such as tungsten and carbon may be combined.

The manufacture of Firthite begins with the mining and concentration of Ferberite ore at our mine in Nederland, Colorado. The concentrate is shipped here where it passes through a chemical refining process resulting in very finely divided tungsten powder of exceptionally high purity. About 6% by weight of carbon is added and the mixture is rolled in ball mills until shaking will not separate the components. After this grinding operation, the tungsten and carbon powders are all passed through a 325 mesh screen. The powder is then placed in a tightly stoppered graphite



A general view of the Firthite shaping department, showing men shaping some of the more difficult tips which is done entirely by hand.

bottle and carburized in a hydrogen furnace. The tungsten carbide is then returned to the ball mill with purified cobalt powder and milled until each grain of carbide is coated with an envelope of the malleable cobalt. As this grinding is done wet, the powder is filtered and dried before pressing in moulds in a 400 ton hydraulic press, which compacts the powder at from 4,000 to 60,000 p.s.i. The material now resembles a druggist's pill, and to confer strength enough to permit shaping the material is next presintered by mechanically stoking it through this furnace against a metered flow of dry hydrogen. This treatment reduces impinging oxide films developed during handling and strengthens the material to about the consistency of graphite or blackboard crayon.

#### Making Man's Hardest Metal

The material can now be sawed, turned, filed, and ground to desired shape and dimensions, keeping in mind that during the final sintering it will shrink 48% by volume or 20% in every linear dimension and become in the process, the densest and hardest metal man has ever made. Final sintering is done in these hydrogen furnaces

at a white heat. Final inspection and quality control tests include determination of cross breaking strength, micro-examination of fracture, specific gravity and Rockwell C hardness.

The making of Firthite tools includes the milling of suitable recesses in the steel shanks and the hand fitting of the Firthite tips therein. Copper brazing in specially designed hydrogen furnaces secures the tips to the supporting shanks. Grinding is done on a variety of pedestal, mechanical, surface, and tool and cutter grinders, using special silicon carbide grinding wheels and diamond impregnated bakelite wheels. Precision tools such as for piston grooving and reaming are finely lapped on cast iron discs charged with diamond dust and olive oil.

Besides our own tool shop, about fifty well known tool making concerns throughout the country are licensed to make Firthite tools of virtually all kinds and designs.

#### Some Typical Firthite Tool Applications

Here we see (showing slide) a Model 10 Sundstrand auto, turning a cast brass valve plug, roughing at  $\frac{3}{2}$  cut, 585 F.P.M. under 0.015 feed

and finishing at  $\frac{1}{4}$  cut, 980 F.P.M. and 0.005 feed. Floor to floor time is 1.41 minutes.

Next a P. and J. cam drum is being made on a No. 7D P. and J. Roughturn  $\frac{1}{4}$  depth 175 F.P.M. 0.057 feed. Finish Turn  $\frac{1}{2}$  depth 300 F.P.M. 0.036 feed. Groove and Face 300 F.P.M. 0.010 feed.

Eighty-five lbs. of semi-steel are removed in eleven minutes. The ten  $\frac{1}{2}$ " grooving tools alone cut fifty lbs. with a total cutting edge engagement of five inches. A 10 $\frac{3}{4}$ " wide Firthite tipped skiving tool is forming a bronze sink fixture from the rough casting in one pass at 320 R.P.M., 2 $\frac{1}{2}$ " per minute feed,  $\frac{1}{2}$  cut. This is interesting because it represents a case of Firthite being applied to a very old turret lathe at no increase in speed over previous tools yet this \$181.00 tool returned \$2,623.00 in indirect savings in the first six months of its use through longer tool life and a finish which made buffing before chrome plating unnecessary.

The last tooth of this huge hydraulic surface broach which broaches the top of the motor block shown in one pass, is Firthite. This set up produces a 2" radiator nipple complete every thirty-five seconds. Rough and finish turn at 250 F.P.M., 0.024" feed giving about ten seconds actual machining time. These cast iron Diesel tractor cast iron pistons are turned, faced, and grooved with Firthite tools. Rough turning, grooving and facing are accomplished in sixty seconds. Finish turning and grooving requires thirty-six seconds.

I have purposely saved the best until the last. Here, we believe is the largest inserted blade face mill ever equipped with sintered carbide tipped inserted blades. Sixty-eight inches in diameter! The fan shaped part spreads the cutting fluid under cut. A 150 H.P. motor drives the cutter through multiple V belts. When cutting, the cutter is entirely enclosed as shown. It plows across the sixty-six inch wide Aluminum slab at 3000 feet per minute, removing  $\frac{1}{16}$ " per pass at about seventy-three inches per minute table feed.



Battery of 6 10-head drillers at the Firth Sterling plant, McKeesport, Penna. Ordinary steel sewing needles, with diamond dust and olive oil, drill holes smaller than human hair. (Hole at back of die nib can be pierced as small as .002".)

# WHAT WOULD YOU HAVE DONE?

By  
**W. F. Schaphorst**  
Mechanical Engineer  
Newark, N. J.

A VERY PROMINENT CONCERN in New Jersey sent blue prints to a number of shops in the U. S. A. and asked for quotations on an intricate piece of mechanism. Quotations were received and the order was placed with a machine shop some 700 miles distant, which means, of course, that the shop receiving the order was not in New Jersey.

A time limit had been placed on the job as is so often the case with machine shop work. In other words the big Jersey concern wanted the job to be delivered pronto. So, in accordance with the conditions of the order the mechanism arrived on time and it was immediately turned over to the battery of testers and checkers employed by the big Jersey company.

The checkers, as also often happens, found that the mechanism was out, here and there, hence not acceptable. They put their official stamp of disapproval and non-acceptance on the job, cleaned their spectacles, and went along with their routine grind of checking and disapproving other jobs that were marked "rush."

What to do? became the big problem now. Being in a hurry for the job the front office men decided that it would take too long to ship the mechanism back to the shop whence it came, 700 miles away, so they elected to turn it over to a small local Jersey shop that was continually doing work for them—a shop that had originally figured on this rush job but didn't get it because their quotation was too high.

Upon receipt of the mechanism by the small Jersey shop the "boss" himself took a hand, as he usually does because he believes in doing things right. He promised that he would do all in his power to correct the errors within one week—that he would work day and night, if necessary, to complete the job within the time he allotted himself.

Nothing was said about price. The job had suddenly become so impor-

tant that the large Jersey company simply had to have it at the earliest possible moment, and besides, knowing the local "boss" as a square shooter they were willing to leave its correction entirely to him, cost what it may.

The boss of the small shop, as usual, checked the dimensions himself to make certain that the errors would be properly corrected. He measured them again. He checked and double checked. Then, confident of himself, he lit a cigarette and smilingly asked his foreman to recheck, and at this point I might add that when the boss had first started to check there were some tense frown wrinkles on his brow such as are commonly worn by checkers. But with every checking and re-checking those wrinkles sort of shifted themselves around on his face and became smile wrinkles, and, finally, when his foreman agreed that the boss was right they both burst forth into raucous laughter.

Why did they laugh? Because they found that the mechanism was correct. It wasn't out at all. The job was just as good as it would have been if they had done it themselves in the first place.

Did this boss immediately call up the prominent concern to inform them of his discovery? He did NOT! He covered the mechanism carefully, kept it seven whole work days, and then delivered it to the prominent concern with a bill for \$250.00 and in due course the bill was paid in full. It was "easy money."

In fairness to this "boss" and all others concerned, I must add that in the course of time the "boss" confessed to the "big shot" of the front office of the prominent concern. During a friendly conversation concerning a loss the boss had just taken on a later job he told the whole truth. He admitted that he hadn't touched the job with a tool and had charged \$250 for doing nothing more than the checking.

The "big shot" seemed to enjoy the occurrence as much as did the "boss" and said, "Any time you can catch us in a mistake like that, go ahead. I would have done the same thing myself if I had been in your place."

What would you have done?

## A.S.T.E. Romance Leads to Wedding Bells

A 100 percent A.S.T.E. romance has led to wedding bells for A.S.T.E.er Emil N. Fabbro and the Assistant National Secretary, (nee) Miss Genevieve Zube. The young couple were united at Santa Maria Church in Detroit, July 28th, leaving for an extended honeymoon tour of several western states.



EMIL N. FABBRO

Mr. Fabbro had been connected with Packard Motor Car Company, Detroit, until his marriage, when he severed his connection to take up other plans. Mrs. Fabbro has been persuaded to stay on at National Headquarters, because of the rush incident to the present phenomenal growth of The Society.

On behalf of The Society, all members join in wishing the newlyweds happiness and prosperity.

# PRODUCTION PERSPECTIVES

News of Mass Manufacturing from Everywhere

Industrial activity in Connecticut during August maintained a high peak, reversing the usual mid-summer trend, with financial and production reports indicating better profits. While some recession was looked for before Fall, the long-range prospects were considered good. . . . **Locke Steel Chain Co.**, Bridgeport, has leased 8,000 square feet of floor space in the former Holmes & Edwards Mfg. Co. plant to be used for increased production of power lawn mowers. . . . **C. O. Jelliffe Mfg. Co.**, Southport, is going ahead with plans for a new building, one story, 50 x 50 feet, to house its plating department. . . . **Crane Co., Bridgeport**, will erect an addition to Building 2H on Housatonic avenue, to be one story, 38 x 60 feet, costing \$8,000. . . . **Plainville Casting Co.**, Plainville, will build a plant addition costing \$12,000, and **Plainville Electro-Plating Co.** an addition costing \$5,000. . . . **Connecticut Foundry Co.**, Rocky Hill, plans an addition, two stories high, 18 x 30 feet. . . . **Scovill Mfg. Co., Waterbury**, has acquired the business of the **Vulcanite Mfg. Co.** of Lindenhurst, L. I., N.Y., and operations will be transferred to the Scoville plant at Oakville. Scovill has also bought the snap fastener division of **Autoyre Co.**, Oakville, and will transfer production to its Waterbury plant. . . . Assets of **Union Wire Die Co.**, Stamford, have been sold to the **Carboly Co., Inc.**, a General Electric subsidiary of Detroit, and the Stamford plant will be continued in operation. . . . **Monroe Guett**, vice-president and director of **Arrow-Hart & Hegeman Electric Co.**, Hartford, which he joined in 1891 as designer and toolmaker, died recently after an illness of six months. . . . **Universal Stamping Machine Co.**, Stamford, has been awarded a \$10,000 contract for parts on stamp cancelling machines for the United States Post Office Department. . . . In an election supervised by the NLRB, the United Electric & Radio Workers of America, CIO affiliate, has been designated as sole bargaining agent for employees of the **Bryant Electric Co.**, Bridgeport. . . . **Metal Workers Association of Waterbury** is a new union of employees of the **American Brass Co.**, whose officers plan later



O. W. Winter, A.S.T.Eer, who has been made Factory Manager for the Columbus McKinnon Chain Corporation, of Tonawanda, New York.

to take in employees of other brass companies. It is understood the new group will contest the **Waterbury Brass Workers Union, CIO affiliate**, for exclusive bargaining rights for American Brass employees. . . . **Pratt & Whitney Aircraft** division of United Aircraft Corp. has announced the appointment of **John J. Borrup** as factory manager, succeeding **Benjamin H. Gilpin**. Borrup is succeeded as general superintendent by **Daniel MacGregor Jack**, and **Charles Lawson** takes the post vacated by Jack. **G. H. D. Miller** becomes assistant to the factory manager. . . . Payroll disbursements in Naugatuck for the month of June totalled \$1,088,777, \$20,529 more than the previous record for a month, established last April. . . . **Harco Co.** has been incorporated in Bridgeport to conduct a general foundry business, with paid-in capital of \$11,000 at start of business.

Manufacture of small tools, taps and dies is going ahead in excellent volume in Massachusetts. **Greenfield Tap & Die Corporation's** business is holding up well, with sales well ahead of last year and with more than 1,300 employed in current operations. **Millers Falls Company** showed a very satisfactory gain in July over a year ago, with sales exceeding expectations and prospects for fall operations favorable. This concern is making some

additions to its lines of hand tools for individual and manufacturer's use.

Demand for home appliances is very good, with a large gain for the year in refrigerator sales assured. Air-conditioning production shows a seasonal easing off at the Westinghouse plant in East Springfield, though nation-wide figures showed a gain of about 60 per cent in June sales over the previous June. The peak for the first half of the year came in March. Household appliances in general have moved in good volume and the outlook for the fall and holiday trade in these items is bright.

Building operations have brought marked gains in business to some producers in this territory. **Ware Coupling & Nipple Company** is building a two story addition of the same width as its present structure, increasing its plant space 50 per cent. There is an increased tendency on the part of many concerns to improve power plant and production facilities.

The **Worcester Stamped Metal Co.** of Worcester, Mass., has just begun addition of 4,000 feet of floor space to the Hunt Street plant. President **Frank E. Billings** said crowded quarters and the need to increase capacity of the plant made construction desirable.

Work has been completed on the new addition to the plant of the **Bay State Abrasive Products Co.**, at Westboro, Mass. A new oil burning system has been installed. The company is now working day and night shifts and plenty of orders are on hand. It will also be necessary for another addition with the removal from Johnstone, R.I. of a plant purchased by Bay State.

Unfilled orders of **Worthington Pump and Machinery Corporation** July 1 were 81 per cent greater than on the same date last year and were at the highest level in 17 years. **H. C. Beaver**, president announced. "As a result," he said, "the principal plants of the corporation, Holyoke, Mass., Harrison and Newark, N.J. and at Buffalo, N.Y. are operating at a high percentage of capacity."

**Frederick Lindstrom**, assistant superintendent of the **Wickwire**

(Continued on Page 18)

# SEPTEMBER CHAPTER MEETINGS

## BRIDGEPORT

September 16, 1937—Barnum Hotel—Bridgeport. Dutch Treat Dinner will be served in the Barnum Coffee Shop at 6:30 for all those wishing to get together for informal discussion before the meeting. Technical session: 8:00 P.M.

**Speaker:** F. W. SHUMARD, Founder and Dean, National School of Time Study.

**Subject:** "Modern Time Study."

Members: Come and bring a guest with you.

## CLEVELAND

Tuesday, September 14, 1937—At The National Acme Company Plant, 170 East 131st at Coit Road—Dinner in the Cafeteria at 6:00 P.M.

A trip through the plant, following the dinner and an address by Mr. A. E. Drissner, Vice-Pres. and Chief Engineer.

Notify C. V. Briner, Pratt and Whitney Co., 1433 E. 12th St. of your intention to attend. Do it early.

## DETROIT

September 9, 1937—Hotel Fort Shelby—Crystal Ballroom. Dinner—6:30 P.M. \$1.75 per plate  
Technical session 8:00 P.M.

**Speaker:** WILLIAM A. HART, member A.S.T.E., Chief Engineer, Colonial Broach Company, Detroit, Michigan.

**Subject:** "Broaches, Equipment and Broaching Methods."

This meeting will be in honor of the past officers of the Society and will be designated as "Past Officers' Night." Mr. Hart's talk will be illustrated with lantern slides. Detroit Student Chapter members are invited to attend. Make your reservations early with any ticket seller or by calling A.S.T.E. office, Madison 7960. Members who cannot attend the dinner are urged to attend the technical session if possible.

## MILWAUKEE

September 9, 1937—Republican Hotel—Colonial Room. Dinner, 6:30 P.M. Price \$1.00

**Speaker:** DEAN F. A. KARTAK, College of Engineering, Marquette University.

**Subject:** "Visual Demonstrations of Fibre Stresses in Materials."

Make your reservations early.

## RACINE

September 13, 1937—Hotel Racine. Dinner, 6:30 P.M.

**Speaker:** MR. H. M. McGAUGHEY, Manager Air Conditioning Division, Nash-Kelvinator Corporation, Detroit, Michigan.

**Meeting:** At this meeting new officers of Racine Chapter will be installed and retiring Chapter Chairman, H. D. Hiatt, who is leaving Racine Chapter, will be honored by the membership, who wish him well in his new venture.

## Production Perspectives

(Continued from page 16)

**Spencer Steel Corp., Palmer, Mass.** said that construction of a new storage building was now under way. The building will be 10,000 square feet and will be used exclusively for the storage of wire Mr. Lindstrom said. The building will cost \$15,000.

**Wyman-Gordon Co., Worcester, Mass.** has started construction of an addition to its plant. The new building will adjoin the present general machine shop and will house the company's die department. This is part of a development program of the company which has included many changes and improvements in its equipment. One new drop hammer has been installed and the remainder have been rebuilt.

**The Atlas Brass & Aluminum Company** has opened a new building on Norman Street, West Springfield, Mass. The new building is 35 by 60 feet in dimensions, brick mill construction. A general jobbing business is done and the new move permits the business to expand.

Machine tool production and general activity of the metal trades continue at a high level in the western New England area. Settlement of the Van Norman Company strike restores Springfield, Mass., to its customary part in producing machine tools and automotive repair devices. Orders from automobile manufacturers for equipment to produce 1938 models have built up machine tool business considerably. These orders were placed ahead of the usual time for prudential reasons and helped to sustain volume in the midsummer period. With other new business they have kept manufacturers supplied with a comfortable backlog.

**Frederick W. McIntyre**, vice president of Reed-Prentice Corp. of Worcester, Mass. has returned from a five weeks' business trip to England. He said the most remarkable trend which caught his attention was a slacking off in the demand, very heavy last year, for machine tools.

**Theodore Meyer and Elmer Taylor**, technical engineers of Norton Co. of Worcester, Mass., have returned after three years at Norton plants in Germany and France. After a vacation of about two and one-half months they will return to their duties abroad.

**Burton W. Cary**, Winchester, has been elected to the board of direc-

tors of Graton & Knight Co., Worcester, Mass., to fill the vacancy caused by the recent death of President Frank E. Willard.

**Two hundred and twenty-five employees** of the speeder and associate departments of the Whitin Machine Works, Whitinsville, Mass. participated in an outing program recently at Spring Lake, Glendale, R.I.

The employees of the Heald Machine Co., Worcester, Mass., and their families picniced at Lake Pearl, Wrentham, recently with an attendance of 3,200.

Negotiations are underway for the possible acquisition of the Russell Manufacturing Company by the Greenfield Tap and Die Corporation. Such an acquisition would unite two streams of early Greenfield manufacturing stemming from the same family. In 1912 the GTD was formed to consolidate the Wiley and Russell Manufacturing Company and the Wells Brothers Company. Since that time it has made a steady growth and now maintains branch plants in Detroit, Mich. and Galt, Ont.

About 125 members of the "Permag" Athletic Association, composed of employees of the Perkins Machine and Gear Company, West Springfield, Mass. together with officials of the company, enjoyed a clambake and outing recently at Turner Grove, East Longmeadow. The committee on the bake comprised James Ingraham, chairman; John O'Day, John Moriarty, George Mills, Arthur Water, Carlo Cassella, Thomas O'Connor and Romeo Beauregard.

**Walter G. Morrison**, assistant superintendent of the Perkins Machine & Gear Co., Inc., West Springfield, Mass. died suddenly August 11 at his camp at Lake Wickaboag, West Brookfield.

**Joel Cook**, 57, for many years superintendent of the Hampden Grinding Wheel Company, Springfield, Mass., until his retirement in 1936 died at his home August 13.

### Mid West

**Otto H. Falk**, Chairman, Allis-Chalmers Manufacturing Company, Milwaukee, has announced that the company will start immediately to spend \$2,650,000 on three plants in an expansion program. Young Radiator Company, Racine, has added Mr. Sidney Smith to its production staff. Mr. Smith was formerly with the Studebaker Corporation and later with the Bantam Bearing Company.

**Apex Electrical Manufacturing Company** of Cleveland has purchased the Zephyr Air Conditioning Division of the Savage Arms Company, Utica, New York, it has been announced by C. G. Frantz, president of the Apex Company. Mr. Frantz stated that machinery used in production of air conditioning units at Utica would be moved to Cleveland and installed in the Apex Company's Bessemer Avenue plants. According to announcement August 13th, the Index of new orders of the National Machine Tool Builders' Association declined in July for the third consecutive month, though remaining above the 1936 level. The drop was wholly in the domestic division while foreign sales showed an increase to a point where it accounted for almost one-third of the total. A rearrangement of plant facilities looking toward the speeding up of manufacturing has been discussed at the Columba Axle Company, Cleveland. The rearrangement of machinery and manner of operation, with some outlay for new equipment, will double the production capacity of the plant, it was said. Columbia produces the two speed overdrive axles for Lincoln Zephyr cars. The Cleaners' Hangers Company of Detroit, Michigan, has moved its manufacturing and sales division to Cleveland—1976 West 3rd Street. A building containing 12,000 square feet of floor space has been acquired and \$20,000 has been spent to remodel the building and install specially made automatic machinery for the manufacture of clothes hangers. The company, headed by Henry C. Ruen moved to Cleveland because of easier access to wire material used in the manufacture of its product. Zenith Metal Products Company is a new corporation in Cleveland, formed by the merger of Zenith Battery Company and the Republic Metal Products Company. The Company is headed by O. T. Wills and will be in the light stamping business and be located at Rockwell Avenue and East 10th Street, Cleveland.

More than \$4,000,000 will be spent by General Motors Corporation in the construction of two factory buildings with the enlargement and rearrangement of the Moraine City, Ohio, manufacturing facilities of the Frigidaire Division. This, the largest expansion undertaken by Frigidaire since 1926, is scheduled for 1938 production activities.

(Continued on page 24)

# CHAPTER DOINGS

## CLEVELAND

R. B. Oswell, Chapter Publicity Chairman,  
1585 Hawthorne Drive, Euclid, Ohio

Cleveland A.S.T.Ers have been enjoying summer vacations, mostly away from the city. Chapter meetings were discontinued during July and August, but an unusually interesting and profitable meeting is planned for this month and is announced on the meeting page of this issue.

C. V. Briner, Cleveland Chapter Secretary, has just returned from Danville, N. Y., and from reports had a good rest and vacation. All Cleveland A.S.T.Ers whose dues are in arrears are requested to "please remit" — either to Detroit National Headquarters or to Mr. Briner, Cleveland Chapter Secretary, % Pratt & Whitney, Cleveland.

## DETROIT

Floyd W. Eaton, Chapter Secretary  
c/o Burroughs Adding Machine Co.,  
Detroit, Michigan

Detroit Chapter's Annual Golf Tournament was held Saturday, July 24th, at Rammler Golf Club, Utica, Michigan. It was a huge success as evidenced by the large attendance and the warm expressions of approval voiced by many of the participants. Entertainment Chairman, W. B. McClellan, and his co-workers, Burt Carpenter, Larry Howe and Howard Snell, were the recipients of frequent commendations. Many members, including Frank Gertiser of Cincinnati Milling Machine Company, whose faces had been missed at recent meetings were in attendance, helping to swell the total to nearly one hundred. Toledo Chapter was represented by members West, Haussman and E. A. Hall. Three guests, M. Kachi, Im. Yoshida and T. Kato, visitors from Japan, participated in the events and one of them won a prize. Burt Carpenter, who was in charge of collecting the prizes several weeks prior to this date, received many fine articles from various sources and the Society feels very grateful to him as well as to the donors. These donations consisted of golf balls, mechanical pencils, sport shoes, desk pen sets, drill sets, mechanical hand books, etc. in addition to the annual trophy.

Golfers commenced to arrive shortly after 8:00 A.M. and the trek continued throughout the day until

## Rockford, Illinois, to Have Charter No. 12

A group of Tool Engineers in Rockford, Illinois, and vicinity have applied to the Society for a Charter to operate a Chapter of the American Society of Tool Engineers in that section.

This will be Chapter No. 12 and the organization meeting has been tentatively set for September 10th at Rockford. Industries in Rockford will hold open house for visitors on that date, and the organization meeting in the evening will be preceded by a banquet.

Mr. E. W. Dickett, Chairman of the organizing committee, informs us that they expect to have between seventy-five and one hundred, perhaps more, charter members of the new Rockford Chapter. This will give Rockford the largest charter membership of any Chapter of the American Society of Tool Engineers outside of the Detroit Chapter. With such a start Rockford seems destined to be a very active and valuable organization for Tool Engineers in that vicinity.

about 5:00 P.M. As the members arrived they were checked in by Treasurer Demorest and then greeted by one of the Golf Committee who arranged the schedules. (The only changes in these arrangements, which were very flexible, were caused by the need of frequent refreshments; water, lemonade, etc.) However, things ran very smoothly, and many good scores (certified) were listed on the cards. C. Ray Brunner and Charles Staples complained of having rheumatism or lumbago upon arrival, and consequently did not play golf. Inasmuch as they actually limped, it was assumed their alibi was painfully perfect.

Dinner was served, after a considerable howl had been set up by the front-porch chair-warmers, piloted by Dan Karpinski, about 5:30 in "grab - what - you - want" style. There was plenty of good food and a good variety. More than one went "back for more beans." The supply of tea, coffee and milk had been exhausted prior to the dinner, we were told.

After the dinner a few songs were sung, in a lusty manner by some of the best voices in the Society, under the able direction of W. B. McClellan, who, by the way, sang a solo himself. Chairman Staples announced the receipt of a "Good Wishes" telegram from George

Smart of Milwaukee Chapter and plans for future meetings were also announced.

Then the awarding of prizes was undertaken by the committee and approximately forty awards were given out to as many individuals. Someone mentioned a "snake in the grass" when it was discovered Burt Carpenter, a member of the committee, had won the "cup" donated each year by Al. Sargent, nevertheless, it was all above-board and the howl set up being only in the spirit of fun; the cup was so presented by Al. Sargent. When the final prize was awarded, the crowd thinned out and the members went their various ways.

We all hope that members, Kuhn, Hebert and Gilliam are now out of the "Dog House." They were, I was told, imprisoned on the charge of awakening sleepy wives, breaking and entering refrigerators and confiscating a good portion of the Sunday provisions, etc. What wife wants to cook weiners at 1:30 A.M.? Ask S. K. Kuhn?

Summing up things we would say the Tournament was highly successful in general, very entertaining and a promulgator of the intensified spirit of friendliness our Society maintains. Members who do not attend the functions and meetings of this chapter are overlooking many good bets. Plan to attend the next gathering and be a winner. We hope the members whose names are mentioned here take no offense, as none is intended.

## MILWAUKEE

Emmor E. Houston,  
Chapter Publicity Chairman,  
1029 South 35th St., Milwaukee, Wisconsin

With the summer season rapidly drawing to a close the Milwaukee Chapter of A.S.T.E. is turning its attention to things more serious. We resume our dinner meetings on Thursday evening September 9th.

Dean F. A. Kartak, College of Engineering Marquette University will be our guest speaker. He will present a visual demonstration of the fibre stresses of materials. This will be a photo electric study of stress concentration in typical fixture design. He will use a new instrument employing polarized light to test clear bakelite and celluloid which will show stresses on application of external forces.

Our picnic was a success, and howl! Here's a picture of our Picnic Committee. Left to Right: Harold Heywood, George A. Smart, Andy

(Continued on page 30)

¶ We wish to extend our best wishes for success to

**FORD R. LAMB**

in his office as Executive-Secretary of the American Society of Tool Engineers.

¶ We also wish to announce the appointment of

**B. L. DIAMOND**

as our Detroit Representative with offices located at 6560 Epworth Boulevard, Phone Tyler 6-1900.

¶ Another well-known member of the American Society of Tool Engineers is ready to serve manufacturers in the Detroit area.

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CONSOLIDATED MACHINE TOOL CORPORATION

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THREADING EQUIPMENT • SELF-OPENING STUD SETTERS  
MODERN-MAGIC DRILL CHUCKS AND COLLET EQUIPMENT

**FIBRO FORGED SOCKET SCREWS  
ARE STRONGER - THEY HAVE CONTINUOUS FIBRES**



**FIBRO FORGED  
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SOCKET SCREWS**

*The results of a New and Better method of  
Socket Screw Manufacturing*

**Patented by** THE HOLO-KROME SCREW CORP.  
Hartford Conn., U. S. A.

Write Engineering Dept. for FREE TEST SCREWS

**HOLO-KROME**

# BUY BARBER-COLMAN GROUND HOBS for Accuracy



## Precision Instruments Used to Check Tooth Form

In addition to splitting the line on a fifty-times-size diagram, the tooth form of Barber-Colman Ground Hobs is subject to direct microscopic measurements which check all of its elements. Symmetry of tooth form for example on a 10-pitch Class A Ground Hob must be within .0002". Starting point of approach curve and variation of straight portion are also held to proportionately close limits. These are only a few of the reasons why you can confidently buy Barber-Colman Ground Hobs for accuracy — service — value.

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MILLING CUTTERS,  
HOBS, HOBBING  
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CHINES, REAMERS,  
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SPECIAL TOOLS

## BARBER-COLMAN COMPANY

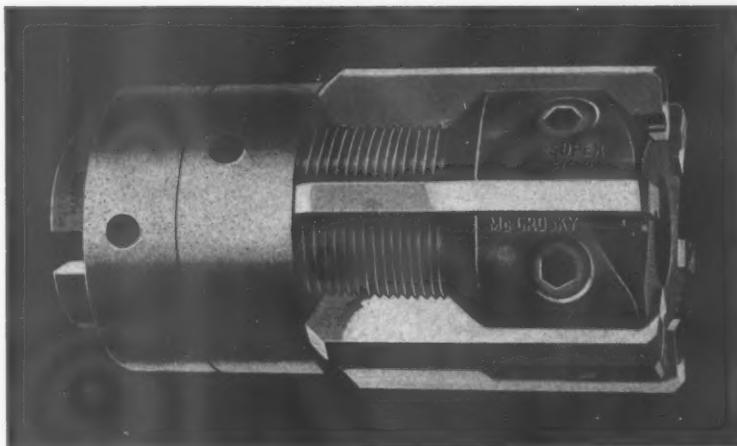
General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

CLEVELAND, OHIO  
Barber-Colman Company  
3030 Euclid Avenue

DETROIT, MICHIGAN  
Hedges Machinery Company  
544 New Center Building

MILWAUKEE, WISCONSIN  
Dumser & Schroeder  
610 West Michigan St.

# FOR YOUR REAMER REFERENCE FILE A NEW McCROSKEY BULLETIN



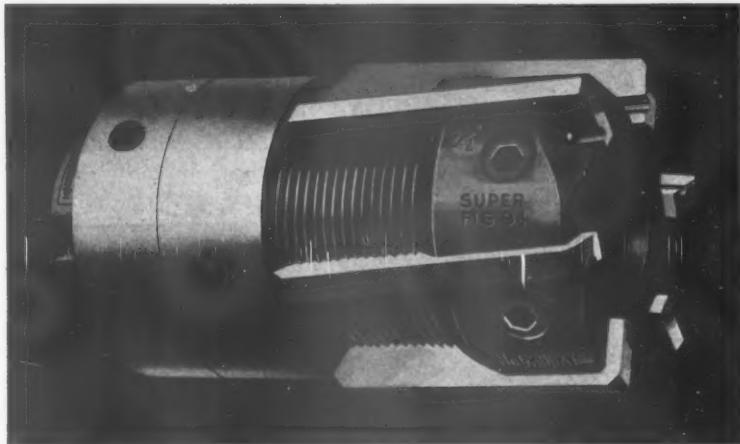
Standard SUPER Reamers are offered in nine styles and in sixteenth sizes from 15/16" to 6" dia.

*Complete Specifications and  
Prices in Bulletin 15-A*

## McCROSKEY-SUPER ADJUSTABLE REAMERS

SUPER Reamer Blades are easily adjusted and at every adjusted position have a full length bearing on the bottoms of the blade slots.

*Details of the SUPER design in Bulletin 15-A*



### NEW BULLETIN



No. 15-A

The SUPER design is readily adaptable to special reamers. Bulletin 15-A shows representative examples of special-purpose SUPERS engineered to definite jobs.

The pages in Bulletin 15-A on FUNDAMENTALS OF REAMER GRINDING will help the man that sharpens your reamers.

*Your request today will bring Bulletin 15-A by return mail.*

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MEADVILLE, PA.

## Production Perspectives

(Continued from page 18)

### West Coast

A huge plant improvement program to cost more than \$4,000,000 will be started at once by the Richfield Oil Company at Watson, California, in the Los Angeles harbor district. Special refinery equipment and a large amount of piping, electric wiring and related equipment are included in the plans. An addition to the aircraft plant of the Northrop Corporation at Lel Se-

gundo, suburb of Los Angeles, will be erected at a cost of \$108,000. Menasco Manufacturing Company of Los Angeles has received an order for thirty-two aircraft engines from the Ryan Aeronautical Company of San Diego. The engines are to be of the 125 and 150 H.P. models, and will cost about \$40,000. The Wire & Metal Manufacturing Company is moving from Glendale to a newly purchased factory at Forty-ninth Street and Everett Avenue, Los Angeles. New equipment is being installed at a cost of \$40,000.



MODERN Industrial machining operations requiring speed, precision and versatility are being handled in hundreds of plants, tool rooms, and machine shops by the new 9-inch South Bend Series "T" Lathes. New features that insure accuracy and maintain it over a period of years, combined with fine workmanship and design, prove these lathes to be a profitable and productive investment.

### SOUTH BEND LATHE WORKS

924 East Madison Street, South Bend, Indiana, U.S.A.

**SOUTH BEND Precision LATHES**  
MODERN LATHES FOR MODERN INDUSTRY



#### 68 Sizes and Types of Lathes for every purpose.

9" Lathe prices start at \$287  
11" Lathe prices start at \$371  
13" Lathe prices start at \$448  
15" Lathe prices start at \$544  
16" Lathe prices start at \$642

#### Write FOR BULLETIN

Bulletin No. 9-C illustrates, describes and prices the different models of the 9-inch lathe. Copy sent free, upon request.

## Travelogue of the Honey-mooners

(Mr. and Mrs. E. N. Fabbro)

On Tuesday, June 29th, we began our Wedding Trip, heading for South Dakota to see the Bad Lands. Then into the Black Hills, where the Rushmore Memorial is being carved out of a solid mountain of rock, a work that should rank with the seven wonders of the world.

Our next—and thrilling—experience was crossing the Big Horn Mountain in Wyoming, which is very dangerous to travel. We recommend the Bear Tooth Mountain in Montana to anyone preferring safety

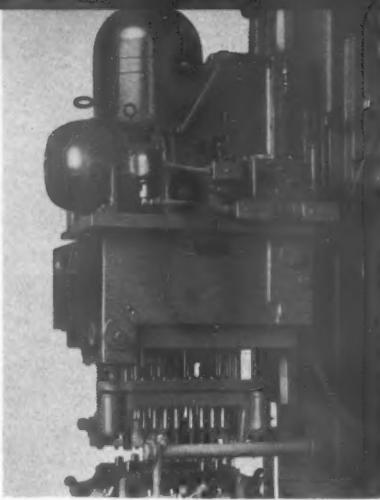


Mrs. E. N. Fabbro

to mountain scenery, although the altitude there is 12,000 feet. In Yellowstone National Park the numerous geysers intrigued our imaginations. At Bingham Canyon, Utah, we saw the largest copper mine in the world.

July 16th, we drove over the Golden Gate Bridge into San Francisco and from there saw for the first time the Pacific Ocean. After shopping in Frisco's Chinatown, we decided to cross the Bay Bridge, an imposing structure, into Oakland. From there we headed for Santa Cruz, then followed a newly completed scenic highway which runs along the coast of California to Los Angeles. There we met the Almquist brothers, located at 2027 Santa Fe Avenue. We presented them with several copies of "The Tool Engineer" and descriptive pamphlets explaining the purpose of the Society which Mr. Ford R. Lamb, Executive Secretary, instructed us to do since we were passing through Los Angeles.

(Continued on Page 38)



### 400 Steel Trunnion Bearings Drilled, C'sunk and Tapped Per Hour

This NATCO Vertical HOLESTEEL Combination Driller and Tapper is drilling, countersinking and tapping two  $5/16$ " diameter holes in each of 400 Steel Trunnion Bearings per hour. Shown directly above is the auxiliary individual lead screw tapping unit mounted on the drilling head.



## Combine Drilling, Countersinking and Tapping Operations on a NATCO HOLESTEEL Machine

Use the NATCO method and Lower Production Costs!



Shown above is one of the new NATCO Vertical HOLESTEEL hydraulic feed machines which is being used by a prominent automobile manufacturer. It is drilling, countersinking and Tapping two  $5/16$ " diameter holes in 400 small Steel Trunnion Bearings per hour.

This machine is arranged with a fixed center spindle box containing a total of 16 drilling spindles and 8 tapping spindles. The tapping spindles are driven by an auxiliary reversing motor drive tapping unit mounted on the head proper. Mounted on the high steel base is a four position fixture arranged to hold four "Trunnion Bearings" in each position. As the parts are indexed from one position to another the required operations are performed.

Combining these operations on one standard NATCO Vertical HOLESTEEL machine has enabled this manufacturer to obtain accurate drilling, countersinking and tapping . . . on a high production basis with remarkable efficiency.

This machine was built for a particular set of operations and ordinarily would be considered special equipment . . . yet it is built of standard NATCO machine elements which are flexible and interchangeable. NATCO Vertical HOLESTEEL Hydraulic Feed Machines are built in a variety of sizes and capacities. Investigate them today. Call a NATCO representative today and let him aid you in coming to a practical and profitable solution of your "hole" problems.

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THE NATIONAL AUTOMATIC TOOL COMPANY  
Richmond, Indiana, U. S. A.

Reduce  
Production Costs!  
Investigate NATCO  
Methods Today

# NATCO

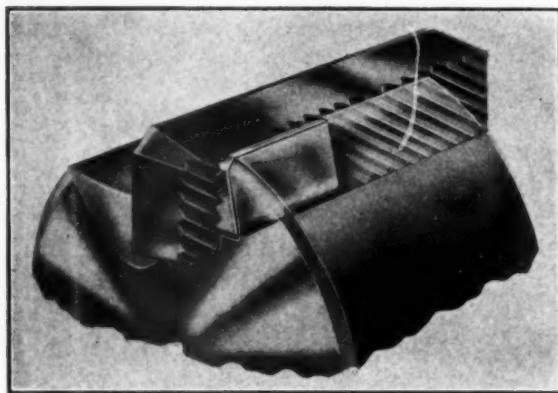
Drilling, Boring and Tapping Machines

## This Month's Cover

# A Revolutionary Advance In Cutter Blade Construction

OUT of more than twenty years devoted exclusively to the development of cutting tools comes the announcement from a Detroit manufacturer of a greatly improved method of locking blades in milling cutters.

The exclusive design of the blade and locking member achieves greater efficiency and longer blade life by a perfected method of locking blade into steel



Blade GAIR-LOCKed in position  
in Cutter head. Patent Pending.

housing with wide range and easy adjustment. There are no wedges to drift out or upset. The blade is conveniently adjusted by striking the rear end, which releases the blade instantly. The blade is then set out the required amount.

The primary purpose of the new blade design is to eliminate the loss of time required to adjust and recondition cutter heads, and to increase chip clearance in the front of the blade where chip space is necessary. The blade locking is securely and effectively accomplished by the locking member fitted to the serrated blade member. Both are inserted into the compound slot lengthwise. The lock is prevented from axial movement endwise by the shoulder of the retaining pocket, which takes the end thrust and causes the lock to move radially outward, automatically locking the blade securely on the bottom and sides of the blade slot.

See illustration.

The blades conform to all designs of inserted blade boring bars and cutter heads, from a single point cutter in bars to multi-blade cutter heads and special reamers and will progressively improve all types of inserted blade tools.

While of special importance in milling cutter construction, GAIR-LOCK blades will improve other types of inserted blade tools as well. They give longer service, permit more blades to contact the work, are easy to position and re-sharpen and have

proven their worth under the most rigid tests in actual production on difficult operations, as is demonstrated on the front cover of this magazine.

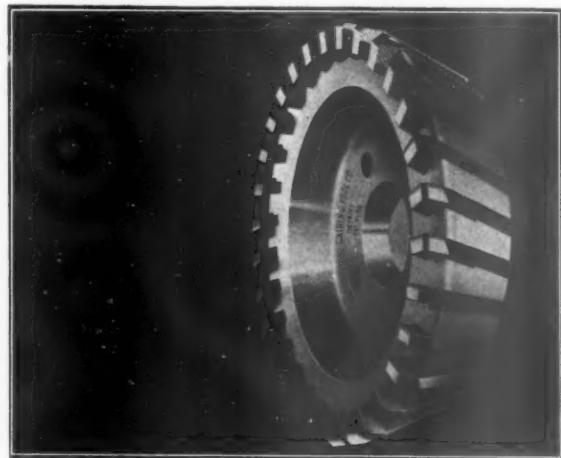
When necessity demands a cutter head with an extremely large number of blades and you need rigidity, you can now have a cutter head as near a solid cutter as is mechanically possible to make. Blades may be positioned in the body at the correct angle and rake to obtain solid tooth cutting action.

Cutter bodies are made of tough Chrome Vanadium Forgings, normalized after rough machining to remove forging strains.

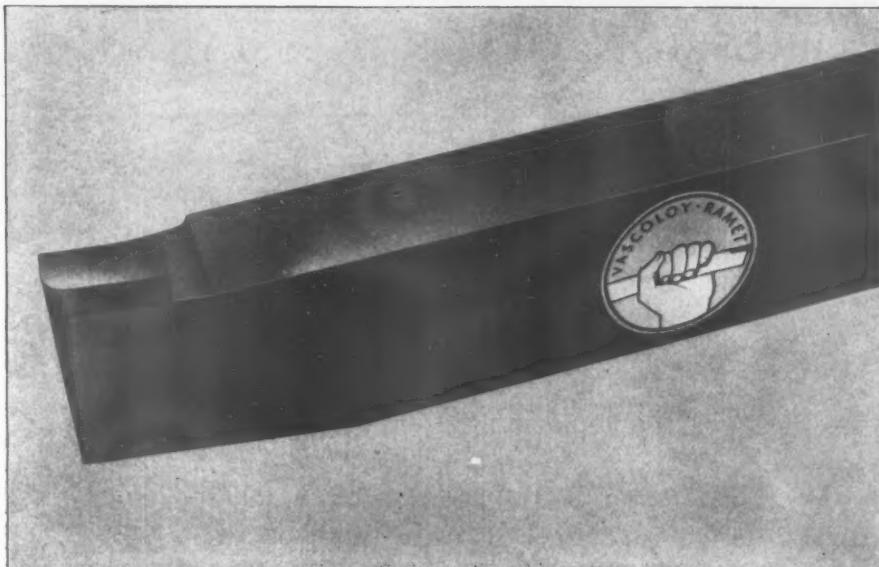
GAIR-LOCK blades can be transposed into different types of cutting tools. Blades used in multiples for one type of cutter head may be interchanged to other types such as boring bars and boring heads, reamers, etc.

### Twelve Important Advantages of the New GAIR-LOCK Blades

1. Minimizes maintenance and facilitates blade setting.
2. Prevents blade shifting and tilting.
3. Affords positive lock, stop and adjustment.
4. Triples blade life—with longer blades, decreases blade cost.
5. Permits more blades per diameter, closer tooth spacing.
6. Adjustable on diameter and length to uniform setting.
7. Blade seats on bottom of blade slot at all times.
8. Eliminates special bodies for Tungsten Carbide Blades—simply set the blades back to obtain necessary support.
9. Prevents chip interference at face of blades.
10. Interchangeability of blades.
11. No auxiliary pins, screws, collars or wrenches required to position blades.
12. Eliminates serrating the cutter body.



This new GAIR-LOCKing Blade is made by the Gairing Tool Co., Inc., 1629 West Lafayette Blvd., Detroit, who will send you their illustrated folder upon request. They extend, without charge to you, the services of their engineering department, who will cheerfully examine your particular problem with a view to working out specialized GAIR-LOCK applications.



Tool made by brazing a V-R blank on steel shank without milling a recess. Great economy may be effected by this method of construction in plants that make their own carbide tools.



Style, R 100



Style, R 200



Style, R 300

V-R blanks in 3 standard styles, R 100, R 200 and R 300, as illustrated, and in sizes to meet every requirement, are available in all grades of Vascoloy-Ramet at new reduced prices. Other shapes and sizes also available for special applications.

Vascoloy-Ramet, the tantalum carbide tool material, is available in three forms, (a) completely finished tools, (b) milled and brazed tools, and (c) blanks.

Produced in 17 standard grades of different tantalum carbide content, strength and hardness, it alone covers the entire range of machinable materials and machining needs.

Harder than any tool steel, its modulus of elasticity is more than twice that of steel, with a cross rupture strength ranging from 170,000

to 350,000 pounds per square inch, depending upon the grade.

Because of its high strength, great hardness and wear resisting qualities, V-R is rapidly winning national acceptance as the preferred tool material. Great industrial plants and small machine shops, as well, are daily finding "a grade for every use" the secret of faster production, more pieces per grind and lowered operating costs.

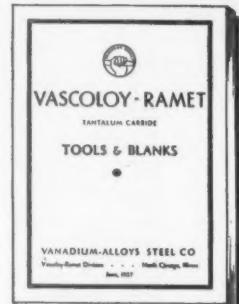
VANADIUM-ALLOYS STEEL CO.  
VASCLOY-RAMET DIVISION, NORTH CHICAGO, ILL.

# VASCLOY-RAMET

... The TANTALUM CARBIDE TOOL MATERIAL ...



A GRADE FOR EVERY USE

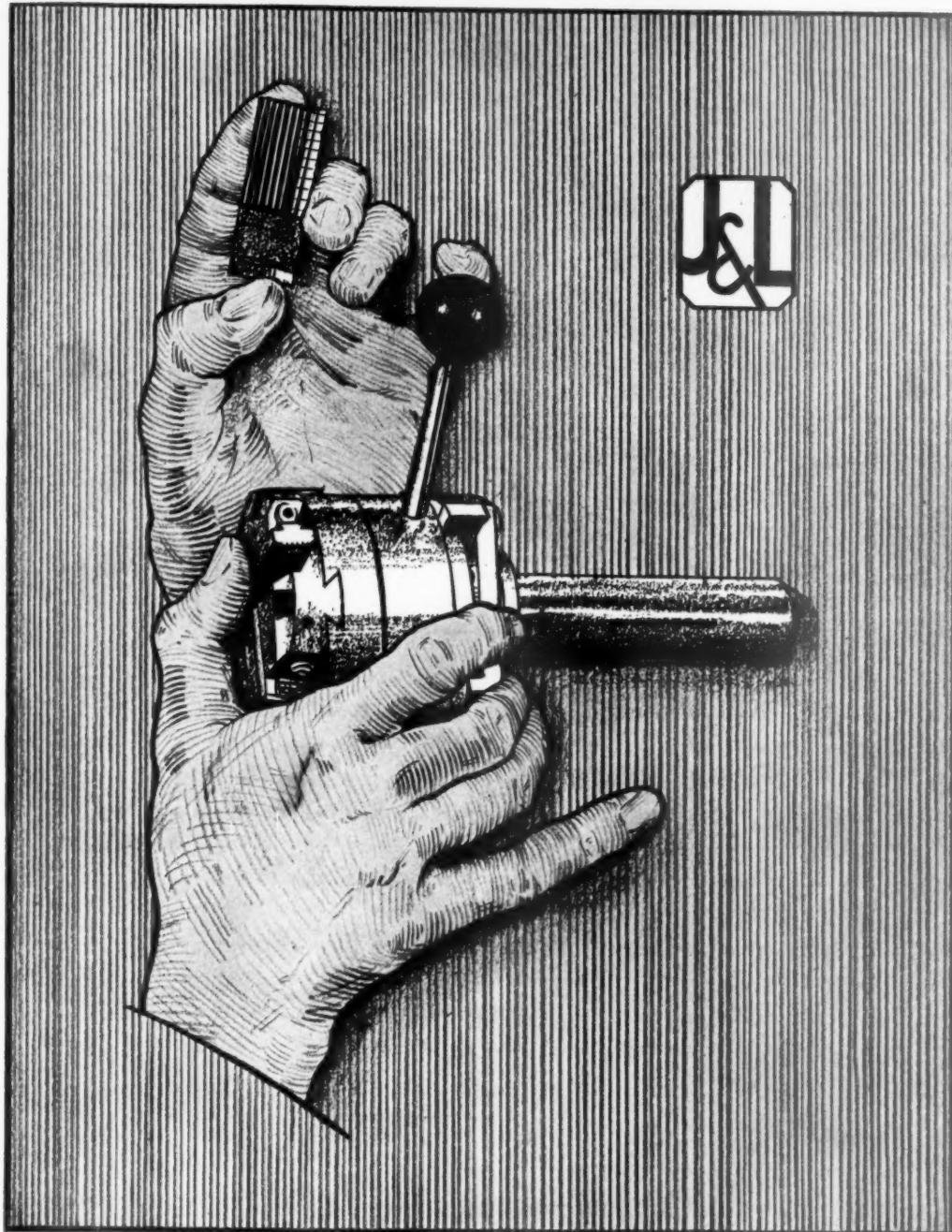


Just off the press. Valuable tool data, prices and complete, simple instructions for making tools with V-R blanks—Send for free copy.

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**THREAD TOOL DIVISION OF THE JONES & LAMSON**

# THE J & L TANGENT DIE WITH GROUND THREAD CHASERS

THE J&L TANGENT DIE is hardened and ground throughout. The die body is not only ground—it is lapped on the face and in the dovetail slots. After hardening, the J&L Tangent Chasers are ground in the thread form for the exact helix angle they are to cut. Only one set of Chaser Holders is required for any right-hand thread within the rated die capacity, regardless of diameter or pitch.

Watch your production go up, your cost go down, with the J&L Tangent Die. It is guaranteed to produce threads within Class-3 tolerance.

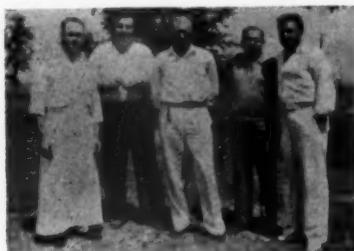
J&L thread tools are backed by years of threading experience. Why not benefit from this experience? Our engineering department is always at your service.

SEND FOR  
NEW BOOKLET

MACHINE COMPANY, SPRINGFIELD, VERMONT

## Chapter Doings

(Continued from page 19)  
Anderson, V. L. Imp, I. A. Schober,  
E. A. Rutzen is holding camera.



Wesley Schaefer, Le Roi Motor, vacationed in New York, N.Y.

Art Johnson, Milwaukee A.S.T.E. Treasurer spent two weeks in Gotham this summer.

We understand that Harry Sedgwick is writing a book which is sure

to be a best seller in Milwaukee. The title is "Trials of a Manufacturing Engineer."

## PITTSBURGH

J. H. Thomas, Chapter Publicity Chairman,  
7442 Pennfield Court, Pittsburgh

It is hard to find any news in these parts when every one is on vacation and no one writes to tell about it. But as the fellow with the head cold would say, "No nudes is good nudes."

Had a letter from Mr. Fred Mondin, a former Pittsburgher and member of Pittsburgh chapter, now living at 54 Seneca St., Pontiac, Mich. (Detroit chapter take notice.) He would welcome a visit from any tool engineers who are in that section.

If I can find enough to fill the column this time everything will be

O.K. Next month we can talk about what will happen at the October meeting, and the month after that we will tell you what did happen.

Something did happen to a local tool engineer. He was out one night and had too much to cure his snake bite. After a while he was trying to get the key in the key hole and making enough noise to awaken the man upstairs who cried, "Go away, you fool, you are trying to get in the wrong house." "Fool yourself," shouted the T.E. "You're looking out of the wrong window."

Then there was the new maid who was to serve her first dinner. "Now please don't spill anything," cautioned the mistress. "All right," she replied, "I'll not say a word."

A young man wanted to hire in the Westinghouse the other day. "Do you know anything about electrical apparatus?" asked the interviewer. "Yes, sir," he replied. "What is an armature?" asked the man. "A person who wants to sing on the radio." He is still looking for work.

Mr. Editor: How about listing the chapter number on the record of chapters in front of the Tool Engineer? A fellow might get in trouble if he gets the wrong number.

## RACINE

H. Springhorn, Chapter Secretary,  
Racine Chapter

Due to the acceptance of a lucrative position in another city, Mr. H. D. Hiatt has been forced to resign his position as Chairman of the Racine Chapter of the A.S.T.E. much to the regret of the members of the Racine Chapter, the community in which he resides and his associates at the Nash-Kelvinator Corp.

His resignation forced the Racine Chapter to hold a special election to fill his office together with the election of a Vice-Chairman, which office had never been previously filled.

After holding this special election, Mr. Eugene Bouton, 1024 Main St., Racine, Production Engineer at J. I. Case Co. Tractor Div., was duly elected Chairman and Mr. Bradford Kiner, 801 Munroe Ave., Racine, Chief Inspector of Nash-Kelvinator Corp., Racine Div., was elected Vice-Chairman.

At the next regular dinner meeting to be held Monday, Sept. 13, at Hotel Racine, the new officers will be inducted to their chairs and Mr. Hiatt will be wished well onto his new venture.

MODELS FOR  
HIGH OR LOW  
PRESSURE

CENTRIFUGAL

**PUMPS**

The **LOGAN** Sure Flow CENTRIFUGAL Pump is SELF-PRIMING, INSTANT FLOWING, and IMPERVIOUS TO ABRASIVES, filings and most corrosive impurities. Simple, compact, self-contained, easily installed. Readily adaptable to most pumping operations. Write for catalog No. 60-NOW.

**FOR PUMPING**

- COOLANT
- WATER
- OIL
- AND OTHER FLUIDS

**LOGANSPORT MACHINE, Inc., LOGANSPORT, IND.**

# Do Your **SMALL LOTS** Mean **HIGH** Manufacturing Costs? **NOT IF YOU USE Heald BORE-MATICS**



IF YOUR production includes miscellaneous parts that come through in small lots, you have probably found that your manufacturing costs were high, especially where close tolerances must be maintained.

Are you familiar with Heald Bore-Matics for this work? These machines are designed for precision boring, turning, facing and grooving operations, using single point diamond or tungsten carbide tools and produce in regular production a degree of precision and surface perfection unsurpassed by any other method. Many of our customers have found them very profitable on parts in even very small quantities.

Fixture equipment for these machines can be furnished to exactly suit your requirements, either a universal fixture to handle a wide variety of miscellaneous work or a simple fixture to handle one or a few particular jobs.

Drop us a line. We'd like to give you additional information on Heald Bore-Matics and show you that small lots do not mean high costs.

Above, a Heald No. 48 Bore-Matic boring and facing a bearing seat in each end of steel bearing retainers. A sliding jaw collet chuck attached to the boring head is used locating the retainer from the O.D. and the end. The boring and facing tool is held in a tool block on the machine table and can be backed off for tool retraction.

## HANDY ANDY'S .. WORKSHOP ..

To begin with, I'd like to know if the Pittsburgh boys were trying to put one over with that crack about "a bun being the lowest kind of wheat." What do you mean, "wheat"? Me, I'm naturally suspicious. Anyway, the rolling mill gang gets the wooden cherry forks—if I can swipe some more. The Pittsburghers are doing a good

job and I get plenty of kick reading their stuff. "Wooden you?"

liked him, and will miss him as a friend. Auf Wiedersehen, G. A.

I wish, here, to pay a personal tribute to A.S.T.Er G. A. Schreiber, who just went West as the result of an automobile accident. Mr. Schreiber was a cosmopolitan, widely traveled; an interesting conversationalist who had something to say to those who would listen. More, he had courage; he had essayed the heights and when things went against him, in middle life, he had the guts to try the heights again. I

There seems to be a little confusion regarding the functions of technical editors assigned to gather in the material for each issue. In that, I am partly at fault due to lack of contacts the past couple of months; however, the boss has been right on my caudal appendage trying to make me work for the company (and how he did!) and the ol' tail has just dragged the ground of late. Anyway, the Technical Editors are supposed to submit, not one article written by themselves, but as many as they can get from authoritative sources on the subject assigned. So now, you know what to do.

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WITH FAST CUTTING  
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SPIRAL DOUBLE-  
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We're always looking for live, interesting stuff, but the way voluntary contributions have been coming in lately I take it that prosperity is on the zoom. Anyway, the Tool Engineers (around Detroit at least) are too busy at their jobs to sit up a night with a sick friend, let alone writing articles. But it's a big country, chuck full of ideas, so get busy, you A.S.T.Ers North East West South and let us show the world that, having set a standard in technical publication, we can keep it up. "Day by day, better and better," as old man Coue said.

You know, I've got some write-ups that I'd like to put across, myself, only nobody pays any attention to my stuff. They take me for a sort of fixture, like a column in a factory. It's there, and it's got to be there—or some sort of support)—although everybody wishes it was somewhere else at some time or other. Anyway, I warn you that I'm going to write an article and publish it the first issue the rest of you boys show any signs of slowing up. Now don't let anything like that happen.

You know, this industrial furore that we're going through reminds me of Mark Twain's complaint about the weather. Everybody talks about it but nobody seems to do anything about it. Like the mice who schemed to bell the cat. 'Twas a grand idea, if only someone would hang the bell.

The situation could be worse, and I'm optimist enough to believe that it's going to be better as soon as the boys in overalls get tired of

(Continued on page 34)



## TURNING AND GROOVING SHEAVES FOR MULTIPLE V-BELT DRIVES

Four FIRTHITE tipped turning and grooving tools are roughing and finishing a 14-inch diameter semi-steel sheave at a cutting speed of 150 feet per minute. The maximum cutting speed with high speed steel tools previously used was 50 feet per minute.

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## Handy Andy's Workshop

(Continued from page 32)

playing with their new toy. For after all, human nature hasn't changed, it's just the system. Whether or not we unanimously accept the new scheme of things cuts little ice; it's here, and here to stay, although there'll be plenty of modifications. As for who's to blame, in the controversy, write your own ticket; at least we can agree that extremes don't work together, especially if on opposite ends of the pole. Eventually there'll be a com-

promise, with the odds favoring the greater intelligence.

To repeat, human nature hasn't changed—at least not very much in the past few millennia. And this hubbub of the times, if not new and novel, is a transient phenomena. Behind the smoke screen are millions of workers, each anxious to earn a living and fully aware that the only way to earn it is by work. Among those millions are the skilled craftsmen, proud of their background of training, imbued with the spirit of competition, the will to advance. They have ideas,

and want to put them across. So, for that matter, do unskilled workers.

Every day, I come in contact with toolmakers, machinists, maintenance and production men, and there are times when, in exasperation, I compare them unfavorably with the boys I grew up with. Then, on sober reflection, I recall that we slumped work too, now and then, and with less excuse because the demand was not so intensive. And, we had the advantage of a systematic apprenticeship training, where a majority of the mechanics of today have had to "steal" their trade. There is a difference, and somehow, I incline to the man who has the gumption to go out and get it.

▼ ▼ ▼

Mingling with men in all walks, the thing that impresses me is their eagerness to suggest new ideas, and that rather refutes the canard that production men are resistant to innovations. That resistance is being propagated from the outside, not from within. But there are always the thinkers, and these sense that new ideas, as labor saving devices, (have you got to using that term yet?) will spread employment rather than curtail it. It always has; it just happened that until lately only a limited minority knew it. That minority is growing. So, I walk through the plant, and: "Say, Mister\_\_\_\_\_, if we could gang this die up we'd eliminate one machine . . . one operation . . . we'd get more production." Or, "Say, that new tool is a honey—twice as easy as the old way." And, I think that is the sales point—to give them better tools that will do the job better, quicker and—easier. No human being with an ounce of sense will resist a device that lightens toil.

▼ ▼ ▼

That is the problem for production men, Tool Engineers, management, to produce new and better methods of doing old things. Mutually alive to the situation, and cooperative, this problem is not difficult of solution. It can be done, is being done. And, it is a wise production executive who encourages his workers to think, by receptiveness to suggestions and a pat on the back or a word of commendation. Doubtless, in this necessary madness that we call mass production, there has been too little of that personal touch the past few years, but it's not too late to start anew. It will pay, in promoting good will and a cooperative spirit, in eliciting new and better ideas. Let's try it.

Handy Andy.

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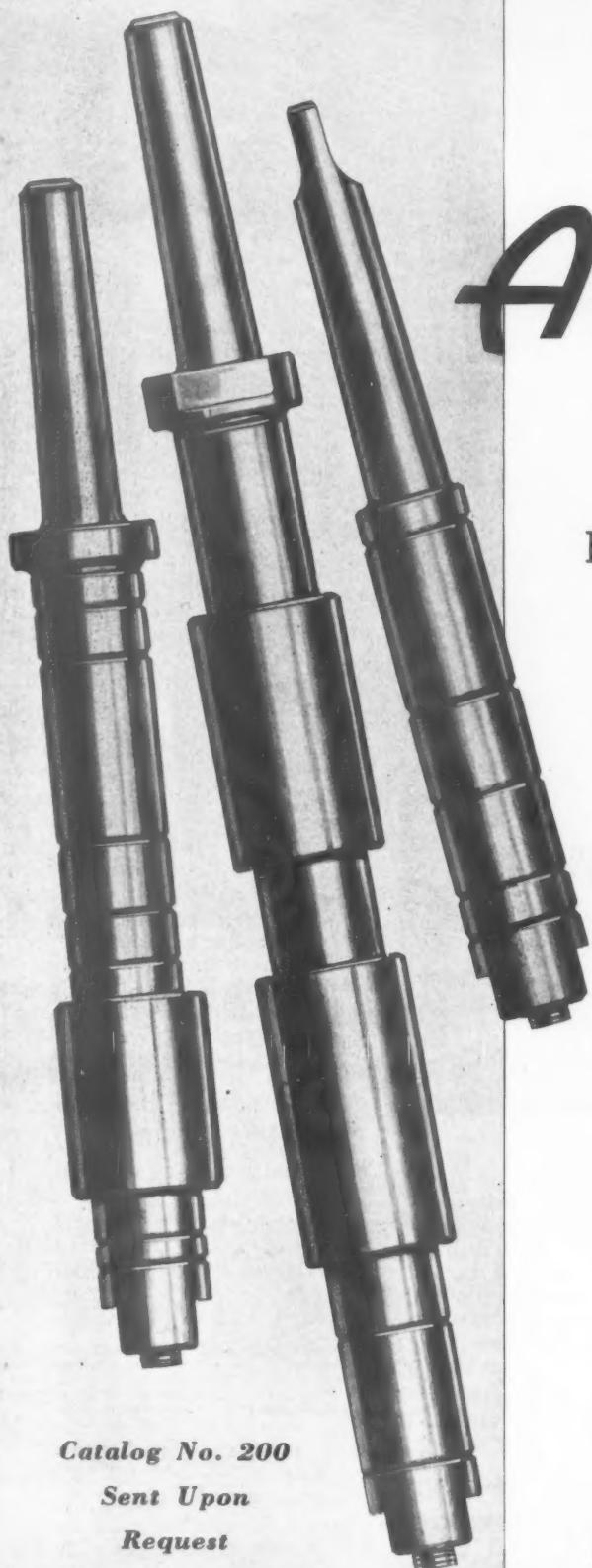
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## TRY-OUTS

"So, finally we come to the question: Who is the brave man? What is courage? That is the thing some people seem to be mixed up about. You hear them say, speaking of a certain man, 'He was a brave man, he felt no fear.' That doesn't follow at all. He might be so dumb he didn't know that there was any danger. The first question investigators ask when awarding the

medal for heroism is, 'Did you recognize the danger?' Because if you didn't you are not entitled to any credit for being brave. The brave man is the man who is afraid and yet who in the face of that fear goes forward. That is courage. Going ahead even when you are afraid. And so, if fears come to you, and come they must to every one of us, and come they do (especially at a time like this)\* yet if in spite of the fears you go on to do the thing that lies before you in the path of duty, don't say that you are a coward if you feel fear, because the measure

of courage is the measure of your fear.

"Just this one word in closing. As I look into your faces I know everyone of you has problems, personal problems that disturb and perplex you. That is always a personal matter. In a Pullman car some time ago I read a sign that said, 'Thirty million people were carried by the Pullman Company last year and only one man killed.' I said to the porter, 'That is a good record.' And he said, 'Yes, but it sure was hard on that one man.' It is always a personal matter. I heard a very wise man say a thing that helped me and I want to tell it to you because I think it will help you. The reason some people get discouraged is that they have a problem, something that bothers them. They sit down to think about it and brood over it and all at once comes the terrible idea that there is no way out, no answer to their troubles, and that is when they get discouraged. And he said this, 'Always remember, every human problem has a solution.' Do you get that? Every human problem has a solution. But where are you going to find the answer to that thing that bothers you tonight? Well, there is one thing sure, you have to look in the right place. That has been one of our troubles. The Master says the Kingdom of Heaven is not just around the corner. The Kingdom of Heaven is within. There is within every man a place where truth dwells in fullness. You have to learn to look within yourself to find the answer to your problems. And the man who has within himself that consciousness of the greatness and goodness of God, who suffers not a sparrow to fall unnoticed to the ground, that man is free from fear. And he can say, 'God is our refuge and strength, a very present help in trouble.' Therefore, we will not fear though the earth be removed and the mountains be carried into the midst of the sea. The Lord of Hosts is with us, the God of Jacob is our refuge."

\* April, 1936.

Editor's Note: This is the conclusion of the address of Mr. Charles M. Newcomb, delivered before Detroit Chapter A.S.T.E. in April, 1937. It has appeared in this column for some months, by popular request.

### New Chapters

New chapters of A.S.T.E. are being formed in New York City, Rockford, Illinois, Cincinnati, Baltimore, Fort Wayne and other industrial centers. If you would like to affiliate with one of these branches, write to the editor of this journal.

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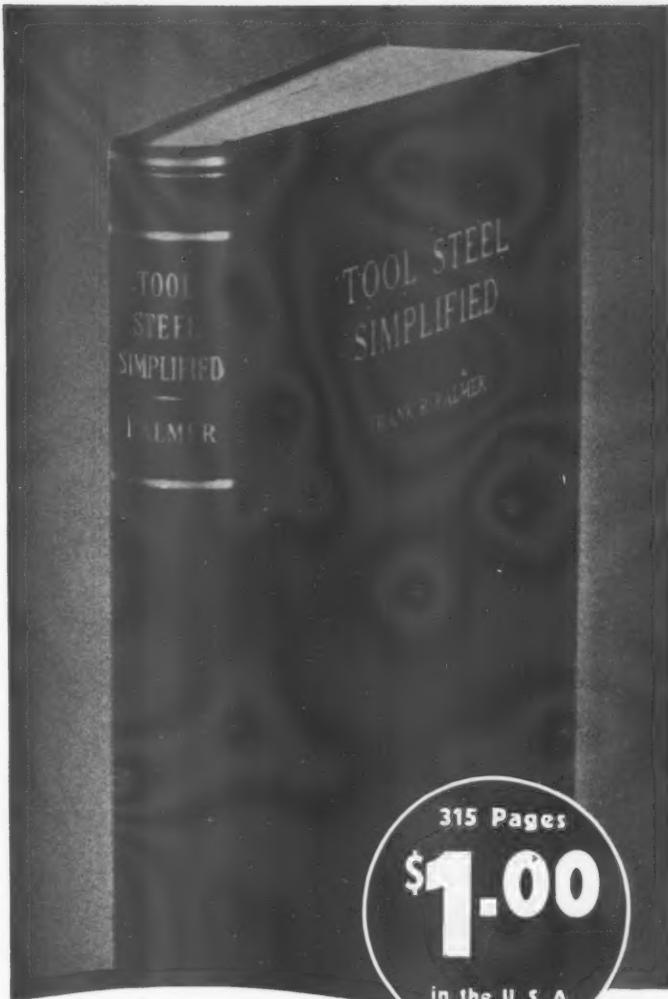
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## Travelogue of the Honeymoons

(Continued from page 24)

We had planned to leave the next day but couldn't resist the invitations extended by Messrs. Carl L. Almquist and C. Gilbere Almquist to remain several days as their guests, which also afforded us the pleasure of meeting their charming wives. They all saw to it that we enjoyed ourselves to the fullest extent, and in seeing as much of Los Angeles as possible, such as the Hollywood Bowl, Los Angeles Plan-

etarium, residential district of the movie stars and many others, explaining to us everything that came before our eyes.

We enjoyed ourselves at the Wilshire Cafe where the best steak dinners are found and particularly where the movie stars congregate, we were quite thrilled at the presence of several film celebrities. To our surprise the spotlight was shone on us, and the wedding march played.

Mrs. C. Gilbert Almquist drove us to the Forest Lawn Cemetery, where we visited the mausoleum, and were

quite impressed by the colored glass window which bears the life like images of "The Lord's Last Supper."

On our last evening, we visited Miss Lucille Brunner, sister of Mr. C. Ray Brunner, National Secretary of A.S.T.E. There we enjoyed a delicious home cooked dinner. We left at midnight, after a very pleasant visit.

Our next stop was at Boulder Dam and then into the Grand Canyon of Arizona. We spent a few days camping and fishing at Marble, Colorado, the old home town. On our way to Denver, we travelled through the Carlton Tunnel which is two miles long and two miles high. In Denver, we saw the most highly illuminated building in the world, owned by the Gas and Electric Company. From there we headed back to Detroit, with visions of some day returning to Los Angeles.

In all, it was a pleasant and educational adventure, a tour that we would recommend to any of our friends, newlywed or honeymooning anew.

## G. A. Schreiber

(Continued from page 12)

ized the Willys-Overland works, Mr. Schreiber was made a production engineer. In later years, he was connected with White Motor Company of Cleveland and General Motors Truck Company of Pontiac, Michigan. The last years of his life were spent as a consulting engineer to the automobile industry.

Mr. Schreiber is survived by his wife and loyal companion, Elizabeth W., who has traveled with him and who was a witness to his tragic end.

Tool Engineers in Detroit, as well as those throughout the country who had worked with him during the past thirty years, all join in extending deepest sympathies to Mrs. Schreiber.

Dumore solved the problem of grinding forming rollers used in making pump tubing. Previously the work was done on specially built machines costing several thousand dollars. The work is now being done on a lathe . . . more accurately . . . and at a fraction of the former cost. Dumore adaptability, high speed extension quills and precision of 1/10,000 of an inch, have made possible hundreds of economical set-ups—internal and external—on lathes, milling machines, planers and shapers. Any of the distributors below will demonstrate—without obligation—any tool in the Dumore line of lathe and hand grinders.

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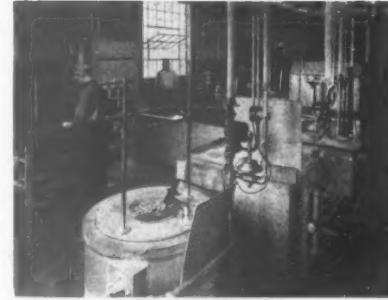
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**THE CARBORUNDUM COMPANY**  
 Detroit, Michigan

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### Here's "Handy Andy"

A number of inquiries have been received concerning "Handy Andy." Several have asked "Who is he?" "What does he do?"

So, we'll introduce him to you, right now. . . . Mr. Andrew E. Rylander, editorial chairman for A.S.T.E., past Secretary of Detroit Chapter and a Director of The Society. "Andy" is a versatile kind of a guy. He has designed numerous factory buildings and plant layouts as well as tools, machines and various production equipment. With all this he is an expert mechanic. He should and does know his stuff, when writing for this publication.

"Andy" started work in a New England textile mill when he was but eleven years of age—"dodging the truant officer" until he started his apprenticeship as a machinist" at thirteen. He completed his early education in evening grade and high schools with correspondence courses on technical subjects. A trade learned, he worked as a Journeyman, then, at seventeen entered college. He has been a "student ever since"—particularly as appertains to shop practice and tooling. As diversions, when not on the job at Midland Steel Products Company, Detroit, he digs into anthropology and evolution and participates in various civic activities.

You'll be "seeing" Handy Andy right along in these pages through his column "Handy Andy's Workshop"—drop him a line any time you like, he'll be glad to hear from you.



"Handy Andy" Rylander

### New Literature

of Interest to the Tool Engineer

The Dumore Company, Dept. 227-J, Racine, Wisconsin: A new bulletin has been issued by the Dumore Company. This bulletin describes the new Dumore lathe grinder No. 12 "the most powerful Dumore lathe grinder ever built." It is said this new Dumore grinder greatly widens the field of precision grinding, permitting the grinding of larger and heavier work—externally or internally—and with accuracies of .00001. Known as the "Chief," this new grinder is dynamically balanced to eliminate vibration. Power from a 1 H.P. motor is transmitted to the quill by two No. 1 section V-belts. For further details address the Dumore Company, Dept. 227-J, Racine, Wisconsin.



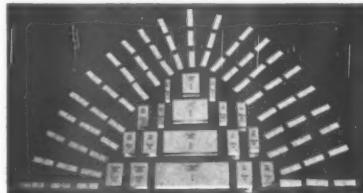
Sundstrand Machine Tool Company, 2531 Eleventh Street, Rockford, Illinois, have issued a circular, describing the new Sundstrand Tool Grinder. This grinder has been especially designed "for accurate,

fast, economical grinding of Cemented Carbides and other cutting tools." Complete information is given in the circular, including photographs, diagrams and explanation of various features to which this new grinder can be applied such as a top rake fixture, a clearance angle fixture, finishing protractor, wheel dressing and drill sharpening. Specifications, shipping weights, etc. are also given.

Hobart Brothers, Dept. T.E., Troy, Ohio, have issued a new, revised edition of the Hobart Arc Welding manual and operators training course. This is a valuable handbook that manufacturing executives will want for a constant source of reference. This book sells regularly at 75 cents per copy, but is available to readers of this publication who mention "The Tool Engineer," at 50 cents per copy.

Renu Tool Company, 317 East Milwaukee Avenue, Detroit, Michigan, has issued a sixteen page, 8½ by 11, attractively printed brochure, covering the various features of tool reclaiming as done by the Renu "methods." The brochure is profusely illustrated and shows the application of the "Renuing" for various types of milling cutters, slitting, slotting and side cutting saws, etc.

### NOW 171 INDUSTRIES DEPEND ON JOHANSSON GAGE BLOCKS



These 81 blocks in Gaging System Set No. 1 are accurate to  $\pm .000008$  inch. They make 120,000 different size gages, in steps of .0001 inch from minimum size of .200 inch to more than 12 inches. Working Set No. 1-B (in case), \$295. Prices of individual blocks start at \$3.50.

From tin cans to locomotives — today 171 different industries depend on Johansson Gage Blocks for accuracy in manufacturing.

Johansson Gage Blocks and Accessories are manufactured and serviced in the United States by

**FORD MOTOR COMPANY**  
Johansson Division Dearborn, Michigan

**FORD MOTOR COMPANY**, Dearborn, Michigan  
Johansson Division, Dept. J

Please send me new Johansson Catalog No. 12 showing all gage blocks and accessories with prices.

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## SPECIALLY DESIGNED as well as standard HIGH PRODUCTION END CUTTING TOOLS

THIS company-owned modern cutter manufacturing plant, comprising 30,000 square feet, equipped with the latest and most efficient types of machine tools and heat-treating equipment, and manned with some hundred and twenty-five employees (a majority ranging from five to fifteen years continuous service), are all devoted to developing and manufacturing high production cutting tools.

The responsibility of this well knit experienced organization is your protection against expensive tool breakdowns.

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Since 1914



Factory Sales  
engineers in  
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**CONTOUR  
MACHINING  
SAVES FOR YOU  
WITH**

*The Metalmaster*



**NEW!**

Built Welding of Precision Saw Blades for quicker saw joining in internal cutting.

Greater table tilt of 45° forward, 10° backward, and 10° laterally.

Closer control of work speed with job selector and speed indicator discs.

Wider speed range with patented "V" Type variable speed pulleys providing infinitely variable velocity of 58 to 800 feet per minute.

Controlled flexible work feed, gravity operated, allowing cutting speeds optimum for the material being worked.

Contour machining has an even wider application with this new combination sawing and filing Metalmaster. Put this machine tool to work for you. It gives the ordinary mechanic the output of an expert one and saves time and material as well.

1. Send for 4-page descriptive Metalmaster folder.
2. Write for formal quotations.
3. Read Contour Sawing Handbook, sent free when requested on business letterhead.



**CONTINENTAL MACHINE SPECIALTIES**  
1301 South Washington Avenue  
MINNEAPOLIS - MINNESOTA

## NEW Equipment

### Norton 14" Multipurpose, Hydraulic Universal Grinding Machine

Norton Company of Worcester, Massachusetts, announces a completely redesigned model of their Multipurpose Grinder. They are now offering this new universal grinding machine in 14" swing and in three lengths, 36", 48", and 72". The new machine is much heavier than previous models and has many advanced features which make it equally efficient for miscellaneous general production or for the tool room.

Among the features of the machine which, it is claimed, add to its versatility and long life with maintenance of accuracy, are: hydraulic power work table traverse, a universal wheel head and work head, the latter being so arranged that either live spindle or dead center are instantly available, force feed lubrication of the table ways, and a wheel spindle of large proportions, each bearing being individually and automatically lubricated.

The machine is designed for direct motor drive only, a feature being that the principal mechanisms are driven each by its individual motor. Five motors are used, three of which, for the hydraulic oil, lubricating oil, and coolant pumps, are built into the machine and are included in the regular equipment.

A flat top swivel table is used, having a large tee slot its entire length. The swivel adjustment at the right end of the table comprises a screw and an arrangement providing close adjustment. Scales are graduated to indicate taper in inches per foot, millimeters per 100 m/m and degree of angle.

The universal headstock is mounted on a swivel base clamped to the table by two bolts in a manner that prevents distortion, it is claimed. The headstock may be turned through the entire 360° and clamped in any desired position. The drive is through vee belts from an adjustable speed motor mounted on the headstock. The spindle and drive plate revolve on large ball bearings and either live spindle or dead center operation is instantly available.

Work table traverse is by hand wheel or by hydraulic power. Hydraulic traverse is by means of a cylinder attached to the under side of the table and two pistons, the rods of which are attached one to each end of the base casing. When hydraulic traverse is used the hand wheel is automatically disengaged. Traverse speeds up to 144" per minute are available.

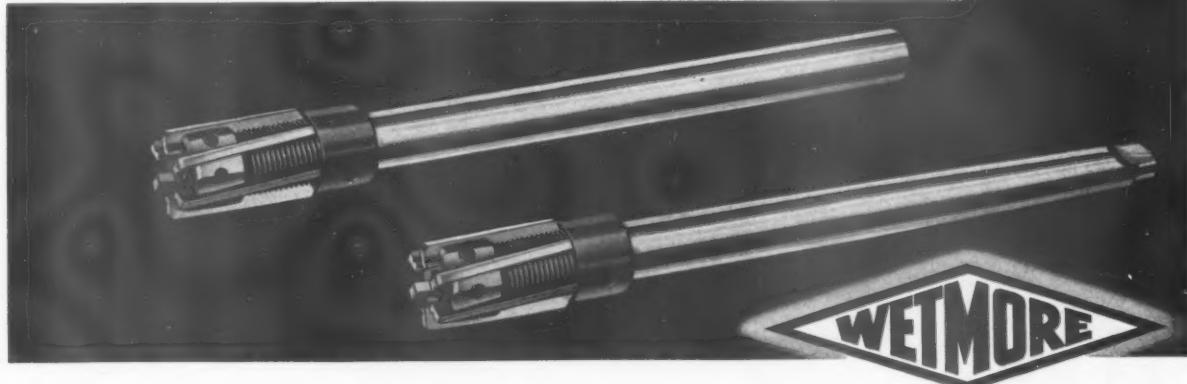
A hand-operated grinding wheel feed indexes to .0001" and also provides for rapid movement when locating with respect to the work. The 48" machine weighs about 8,000 lbs., mounts wheels up to 14 x 1½" for cylindrical grinding or cup type wheels 12 x 3" for face grinding and will swing work 14<sup>15</sup> over the table top. A 5 H.P. motor is required for the wheel drive and ½ H.P. for the work drive.

▼ ▼ ▼  
Knu-Vise Products Company, 6432 Cass Avenue, Detroit, Michigan, announce the Knu-Vise drill jig and Knuckle Action Vise. The Knu-Vise drill jigs provide a common base with quick clamping action for all future drill jigs. Work is held rigidly and is easy to load and unload at all times in plain sight of

(Continued on Page 46)

## Left Hand Angle Cutting Blades . . . . A Feature Of This Fine $\frac{5}{8}$ in. to 31/32 in. WETMORE REAMER

The Type No. 36 Wetmore Adjustable Heavy-Duty Reamer is noted for easy adjustment, long blade life and marked adaptability to screw machine work . . . features of the famous Wetmore design. Write for Catalog No. 36.



### ● SPECIAL TOOLS

Designers and tool engineers are invited to avail themselves of our consulting service on all reaming operations—standard or special. We build practical and efficient special tools to decrease your manufacturing costs.

WETMORE REAMER COMPANY - Dept. TL, 420 N. 27th St., Milwaukee, Wis.



## TEST INDICATORS

Can Now Be Furnished  
in TWO MODELS

These FEDERAL Small Test Indicators are exceptionally compact and adaptable precision instruments. Their lightness and sensitivity are of especial value with regard to accuracy when used with light supporting members. By merely shifting the reversing lever the motion of the point is reversed. The instrument has a FEDERAL Low-Friction Jeweled movement.

### MODEL ONE

Graduated 1/1000"  
Range . . . .030"

### MODEL TWO

Graduated 1/10,000"  
Range . . . .008"  
Send for Circular

They can be used  
in surface gauges,  
height gauges, or  
tool posts and are  
quickly adapted to  
special fixtures.



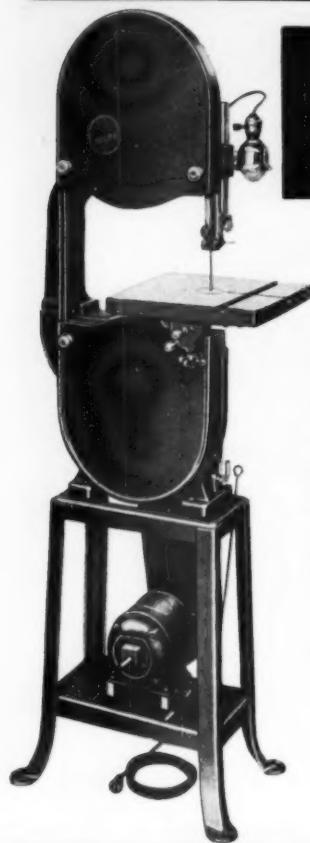
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## New Metal Cutting 14 inch BAND SAW

The regular 14-inch Delta band saw, fitted with countershaft to reduce the speed, has been used in hundreds of shops for cutting Iron, Steel, Brass, Bronze and Aluminum bars, shapes and sheets; in foundries for cutting off gates, in die-casting shops for trimming and sawing castings.

Here is a new and improved back-geared model which is even more ideal for this work. It is the perfect machine for the general machine shop, toolroom or experimental shop, where many different materials must be cut.

It takes the place of a power hacksaw in cutting off bars and shapes; it is used in the toolroom for sawing off tool, die and fixture stock; it will cut uniform strips from sheets; it saves hours of time in cutting templates and similar tools, and will cut almost any material, such as asbestos, mica, vulcanite, fiber, etc. . . . difficult to cut by ordinary means.

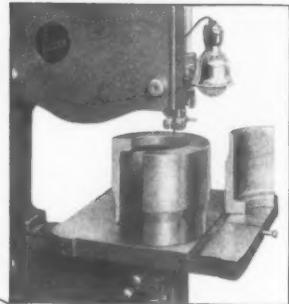
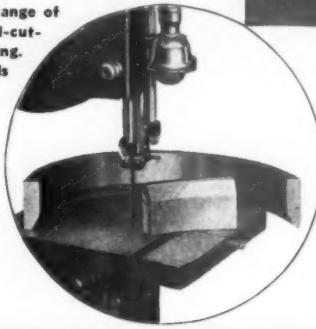
It will "double in wood," too, by a simple change of belts, as provision is made for four low metal-cutting speeds and one high speed for wood sawing. Write for special circular giving full details and specifications.

**\$7950**

14" back-geared Metal-Cutting Band Saw, complete with guards, 8" arbor pulley for wood and cone pulley for metal. With one 14-tooth metal-cutting blade. Without light attachment, belts, stand, motor or motor-pulley. Shipping weight 175 lbs.

**DELTA MFG. CO.**

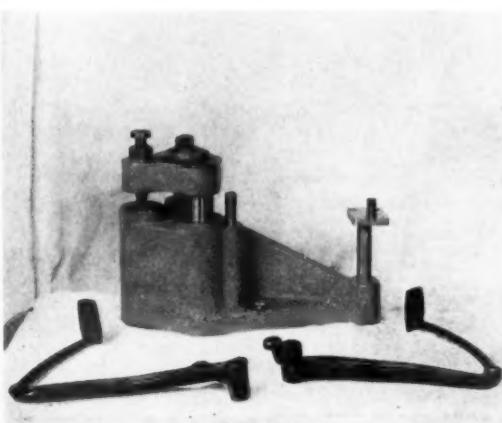
601 East Vienna Ave.  
MILWAUKEE, WISCONSIN



One of these draw-die segment rings was impractical to cut on the milling machine because of the diameter of cutter required; the other because the diameter of the ring was too large for the milling machine. Both, however, are cut with ease and speed on the Delta band saw. Try your next "awkward" job on one of these versatile tools.

## Q-C ENGINEERING

The consistent growth of our business over the years is due, we believe, to not only the outstanding quality of our "Standardized" products, but also to our policy of meeting delivery promises in an unfailing manner.



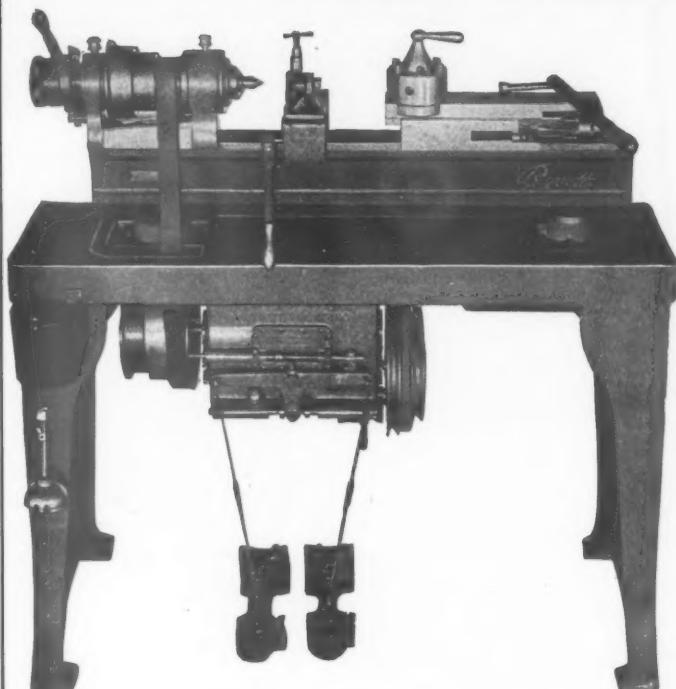
One of the set-ups consisting of 9 fixtures for drilling several sizes and types of clutch and brake levers.

If you are not as yet familiar with the satisfaction secured when placing your "tooling" needs with us, we suggest you allow us to convince you.

Designing and building dies, jigs, fixtures and special machinery, supplemented by the largest and most comprehensive line of "Standardized" tooling units.

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3801 Trenton Ave., Detroit, Mich.

# RIVETT HAND SCREW MACHINE



The productive earning power of a Rivett Hand Screw Machine with Speed Box Motor Drive may well double that of old type counter or jackshaft driven units. Continuous duty is guaranteed with "trouble-free" spindle equipped with Timken "Zero" precision roller bearings or preloaded precision ball bearings.

Motor runs continuously, selective speeds are available by convenient foot or hand control and automatic brake stops spindle instantly for chucking new work. Double production from no lost time.

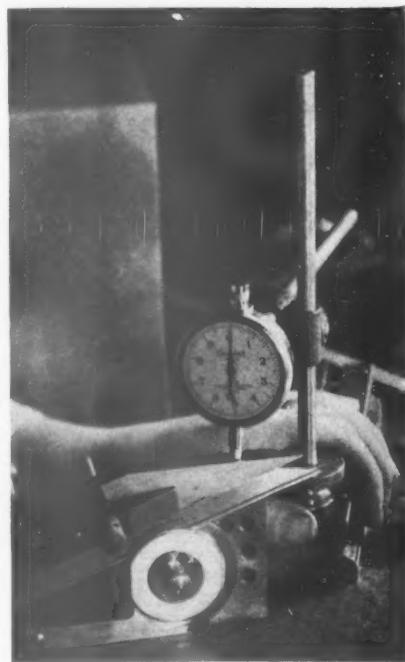
*Bulletin 505 RB and 505 BB*

**RIVETT LATHE & GRINDER INC.**  
**BRIGHTON, BOSTON, MASS.**



The second edition of Starrett Dial Indicator Catalog T illustrates and describes the complete line of STARRETT and LAST WORD Indicators and shows many new attachments and features that increase their adaptability to countless measuring, testing and inspecting operations. If you use dial indicators, you will value a copy. Write for one.

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*World's Greatest Toolmakers*  
Manufacturers of Hacksaws Unexcelled  
Steel Tapes—Standard for Accuracy  
Dial Indicators for Every Requirement  
Athol, Mass., U. S. A.



# Starrett Dial Indicators

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Don't let another day pass without investigating the tremendous profit possibilities that come from this new arc welding. Write for any of the three books you want and information on the liberal 30 Days Trial Offer. Hobart Brothers, one of the world's largest manufacturers of Arc Welders, Box TE-97, Troy, Ohio.

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Today

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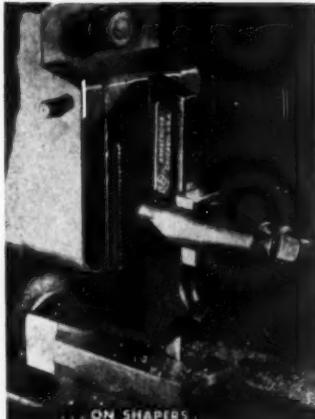
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Every tool should  
pay a profit . . .  
Every ARMSTRONG  
Tool Holder will

Each hour spent in forging cutting tools is an hour needlessly lost for today there is an ARMSTRONG TOOL HOLDER for every operation on lathes, planers, slotters and shapers . . . a better tool than can be forged for each embodies the perfection and design developed through almost a half century of specialization in the design and manufacture of cutting tools, and the strength possible only where there is every modern manufacturing facility. In each ARMSTRONG TOOL HOLDER you have a multi-purpose tool that equals a complete set of forged tools, a permanent tool that is part of a complete System of Tools that keeps you permanently tool-ed up and "Saves All Forging, 70% Grinding and 90% High Speed Steel." A system in which every tool is certain to do its full job . . . to pay its cost over and over again, to pay a full profit on every machine hour and to cut tool costs and cutting costs to an absolute minimum.



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199 Lafayette St., New York, N.Y.  
San Francisco London



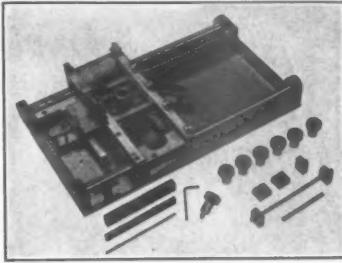
(Continued from Page 42)

the operator. Outstanding features claimed are a tremendous pressure which rapidly multiplies as the handle is actuated, which, it is said, results in much greater pressure with much less effort on the handle.

The Drill Jig is provided with laminated vice jaws, case-hardened and ground. The angle bracket support is adjustable and the jaws are supplied as blanks, thus allowing the tool room to finish them to suit the particular requirements of the job.

▼ ▼ ▼

The new Micro-Precision Universal Jig is being manufactured by Henderson & Kaye of 112 North Batavia Street, Batavia, Illinois. Its many distinct advantages and various uses, it is claimed, make this new instrument outstanding in its field. The Micro-Precision Universal Jig, it is said, insures greater speed and layout accuracy, permits faster setting up, laying out and drilling to accurate centers. Laying out accurate centers for 3, 4, 5, 6, 7, 8, 10, 12, or 16 holes equally spaced in the circumference is simple as ABC.



For example, with the Micro-Precision Universal Jig, a layout for six holes can be set up, the holes drilled and reamed ALL in a period of only forty-five minutes and ALL to an accuracy of .001".

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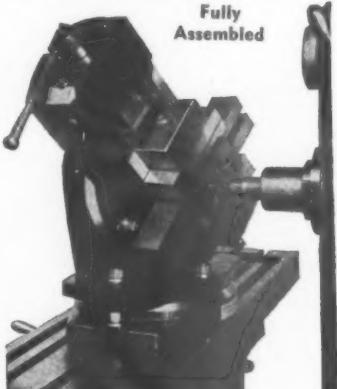
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They quickly pay  
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Investigate the  
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Let us show you how to make cheaper and better jigs and fixtures at a greatly reduced cost—with a great saving in time.

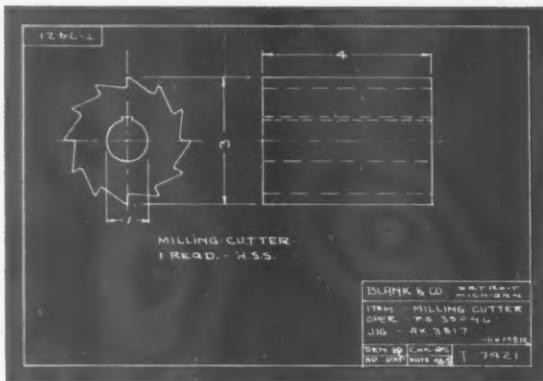
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Sales Division  
110 S. Dearborn St.,

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That, to some people, is a milling cutter and is comparable to designing an automobile by putting four wheels on a box.

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Milling Cutter Engineers  
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## Universal $1\frac{1}{8}'' \times 1\frac{1}{8}''$ or $18'' \times 18''$



straight cuts or angle cuts . . . any degree right or left  
handles large work and small work with equal facility

**M**ARVEL No. 8 The universal Metal Band Saw that will handle any job—the lightest, most delicate work as well as extremely large and heavy work up to  $18'' \times 18''$ . Work is always held stationary on the bed, and blade feeds into work at any angle to  $45^\circ$  right or left.

With a Marvel No. 8 you can turn "warehouse cutting extras" into extra profits—can avoid delays, can save expensive machine hours roughing-out, can do notching, blocking and coping work more easily and economically.

Extremely accurate and flexible with hand or power feed, the No. 8 is the busiest machine in most shops and tool rooms. The new 1935 model is heavier, with moving parts fully protected . . . and faster (will accurately cut off 9" round No. 1020 steel in 20 minutes).

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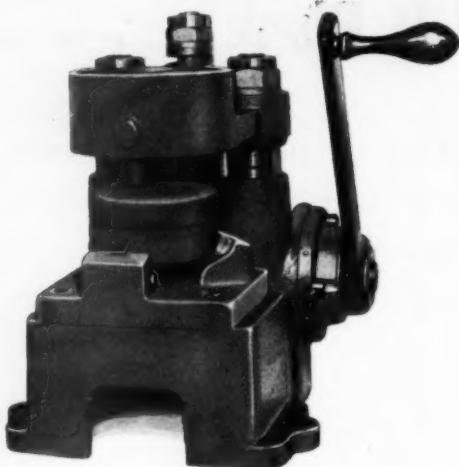


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**O K** INSERTED-BLADE Milling Cutters are made in a wide range of sizes. This enables you to standardize your shop with this time-tested, cost-cutting tool, or to find just what you want for a special job.

In O K Milling Cutters the inserted blades, that do the cutting, are of high-speed steel specially heat treated for edge life; the body, which does no cutting, is of chrome nickel steel heat treated for strength. There is a distinct saving in the cost of cutting steel, and the ready adjustment possible for wear compensation works to cut down the total time cost.

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OF INSERTED-BLADE METAL CUTTING TOOLS



UNIVERSAL STANDARD  
DRILL BUSHINGS  
MADE TO A.S.A. SIZES  
LOWEST COST -- LONGEST LIFE  
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AND TROUBLE . . . BY  
SPECIFYING NATIONAL  
TWIST DRILLS, HOBS,  
REAMERS . . . MILLING  
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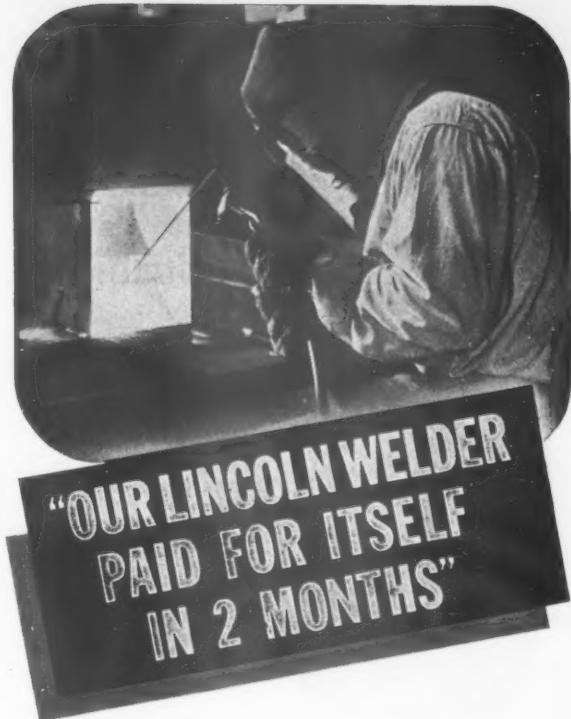
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DRILL AND TOOL CO.

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Tap and Die Division, WINTER BROS. CO., Wrentham, Mass.  
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Lincoln's large quantity production brings you this welder at the lowest price set for this type of welding equipment. Easy terms can be arranged. Mail the coupon for details.



● Every user of tools who is interested in improvements that LOWER production costs should inform himself on "Maxi" Taps, "Acorn" Dies and "Rex" Gages.

Every one of these tools can be tested by the user, in his own plant on a "make good or make room" basis. Consult your distributor or get in touch with us direct.

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Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

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Special Gaging Fixtures



*Illustrating a gage to check within thirty millionths the squareness of face with hole of a refrigerator part.*

## R. & M. MANUFACTURING COMPANY

Detroit, Michigan

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OF AMERICA**

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DETROIT, MICH.



Manufacturers of  
Multiple Drill Heads



Special High Production  
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## START NOW!

SAVE TAP BREAKAGE  
INCREASE OUTPUT  
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with the new

**PROCUNIER  
HIGH SPEED  
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**REVOLUTIONIZING  
"TRU-GRIP"  
TAP HOLDER**

The Most Sensible Tap  
Holder That Ever  
Gripped a Tap



Tool Engineers everywhere are proclaiming the new TRU-GRIP tap holder as the finest tap holder that ever gripped a tap. The extreme lightness and accuracy of this new tap holder eliminates tap breakage and lengthens the lives of the taps. PROCUNIER high-speed tappers pay for themselves in just a few months. Send now for full details.

## PROCUNIER SAFETY CHUCK CO.

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CHICAGO, ILL.

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## FLEXIBLE SHAFT MACHINES

Type MY4—1/4 H.P.



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Tool and Die Makers Everywhere

Know the quality of "Strand" Machines.

Sixty types and sizes  $\frac{1}{8}$  to 2 H.P.

This Universal Swiveling Machine, our latest development with a right angle hand piece, is in great demand by the tool and die makers. Furnished with speeds of 1700—3000—5200 or 3400—6000—10,400

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No Screw Point

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can now be repaired without removing the part or dismantling machine. The Handee uses 200 different accessories, instantly interchangeable, for work on all metals, alloys, bakelite, celluloid, wood, glass, resins and other hard substances.

Finest, speediest, most powerful tool for its type. 25,000 r.p.m. AC or DC, 110 volts. Weighs only 12 ounces. No shop or factory can afford to be without the Handee. Try one.

De Luxe Model \$18.50 post-paid  
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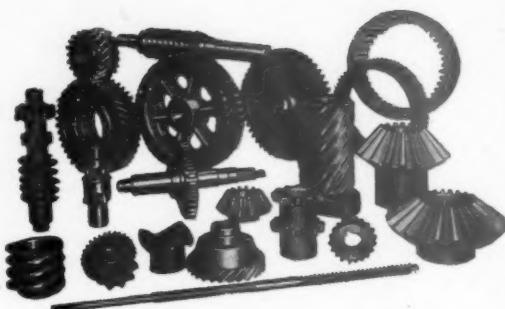


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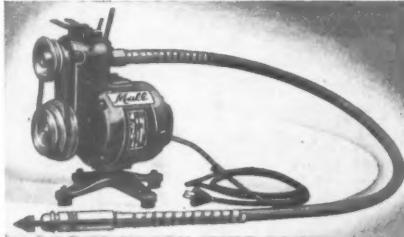
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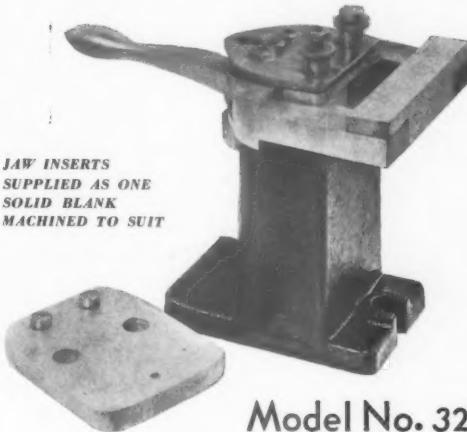
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Fig.  
1507

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## Advertisers' Index

Abart Gear and Machine Co.	52	Jones & Lamson Machine Co.	29
Acme Industrial Co.	50	Knu-Vise Products Co.	53
American Twist Drill Co.	39	Krueger & Co., H. R.	50
Ames, B. C. Co.	51	Larkin Packer Co., Inc.	4
Armstrong Blum Manufacturing Co.	47	Lincoln Electric Co., The	49
Armstrong Bros. Tool Co.	45	Logansport Machine, Inc.	30
Barber-Colman Co.	22	Mall Tool Co.	53
Brown & Sharpe Mfg. Co.	55	McCrosky Tool Corp.	23
Carborundum Co.	40	Modern Tool Works	20
Carpenter Steel Co.	37	National Automatic Tool Co.	25
Chicago Wheel & Mfg. Co.	51	National Twist Drill & Tool Co.	49
Consolidated Machine Tool Corp.	20	Odin Universal Engineering Co.	46
Continental Machine Specialties	42	O. K. Tool Co., The	48
Danly Machine Specialties, Inc.	36	Oster Manufacturing Co.	54
Davis Boring Tool Division	4	Pratt & Whitney	2
Delta Mfg. Co.	44	Procunier Safety Chuck Co.	50
Detroit Beach Co.	51	R. & M. Manufacturing Co.	50
Dumore Co.	38	Rivett Lathe & Grinder, Inc.	45
Eclipse Counterbore Co.	41	Ross Operating Valve Co.	54
Ex-Cell-O Corp.	56	Scully-Jones & Co.	35
Federal Products Corp.	43	Sheldon Machine Co.	52
Firth-Stirling Steel Co.	33	South Bend Lathe Works	24
Ford Motor Co. Johansson Division	41	Standard Pressed Steel Co.	54
Gairing Tool Co.	1, 26	Starrett Co., The L. S.	45
Commons-Holman Co., The	52	Strand & Co., N. A.	51
Glenzer Co., The J. C.	53	Sundstrand Machine Tool Co.	7
Goddard & Goddard Co.	47	Swartz Tool Products Co.	48
Greenfield Tap & Die Corp.	49	Tomkins-Johnson Co., The	52
Hennifin Mfg. Co.	8	Union Carbide & Carbon Co.	5
Haskins Co., R. G.	34	Universal Engineering Co.	49, 54
Haynes Stellite Co.	5	Vanadium-Alloys Steel Co.	27
Heald Machine Co.	31	Vickers, Inc.	3
Hobart Bros. Co.	48	Vinco Tool Co.	53
Holo Krome Screw Corp.	21	Weldon Tool Co., The	32
		Wetmore Reamer Co.	43

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